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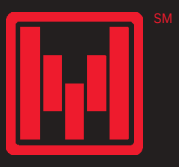

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In this issue of the *Journal of Technical Analysis* is the winning paper for the Charles H. Dow Award in 2003. It is an excellent and well-written article on a new way of approaching the old question of relative strength. I particularly enjoyed Gary Anderson's description of "positive feedback" and "negative feedback." It is one of the best explanations I have seen on the constant war between trend and no trend, growth and contrarian, and buy low and sell high versus buy high and sell higher.

The focus of this issue, as you will see, is Elliott Wave. Some people believe that Elliott analysis is hooey, but its ability to withstand time and criticism speaks for itself. Of course, we could say the same for astrology, but Elliott is now becoming quantified and thus more understood in detail. Steve Poser's article questions some of the basics of Elliott Wave without questioning Elliott Wave itself. Rich Swannell has done extensive computer work in identifying the characteristics of Elliott Waves over different markets, different time periods, and different directions. He gives us the results of some of those studies, and at the same time, describes the basic rules of Elliott. And finally we have an article by the master of Elliott Wave, Bob Prechter. His discussion concerns the intriguing aspect of how some wave types tend to have the same proportions of length and height, based principally on Fibonacci ratios, and form almost identical patterns irrespective of the period over which they are observed. This fractal nature of Elliott Waves, as we all know, is also observed in more conventional technical patterns and is one of the most interesting aspects of technical analysis.

Charles D. Kirkpatrick II, CMT, Editor

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The Janus Factor

Gary Anderson

Jan' us: Early Roman god of gates and portals, represented by two opposing faces, suggesting the two sides of a door. Janus symbolizes the two-sided nature of things.

Traders alternate between two modes. At times traders exhibit trend-following behavior. Relatively strong stocks are favored, while laggards are sold or ignored. At other times, the reverse is true. Traders in the aggregate turn contrarian. Profits are taken in stocks that have been strong, and proceeds are redirected into relative-strength laggards. This paper presents the market as a system of capital flows reducible to the effects of traders' Janus-like behavior.

Arriving at a systematic view of a process may begin with a series of inferences or with one or two analogical leaps. Every model is ultimately the expression of one thing we hope to understand in terms of other things we do understand, and analogies, like pictures, are useful devices that simplify and clarify, particularly early on. In the end, understanding must be grounded on primitive notions, each of which pictures some part of the whole and which we agree to accept on intuitive merit.

As a foundation for method, two pictures are offered. First, we will look at feedback loops. Next, I will introduce a new approach to relative-strength. Then, the concepts of feedback and relative strength will be fused to portray the market as a system of capital flows.

But the market is a hard taskmaster and demands that insights provided by analogical thinking be translated into explicit method. So, finally, I will offer two demonstrations of the power of the methods outlined in this paper.

Feedback Loops

Feedback is commonplace. Businesses routinely solicit feedback from customers, and that information is returned to the marketplace in the form of improved products and services. The best companies seek feedback continuously, and in the process convert information into long-term success. To a large extent such feedback determines winners and losers and, more generally, helps move the economy forward. In a free-market society feedback is pervasive, so it should come as no surprise that feedback is at work in the equities market as well.

There are two sorts of feedback—positive and negative.

A common example of **positive feedback** is the audio screech that occurs when a microphone gets too close to a speaker. Sound from the speaker is picked up by the microphone, then amplified and sent back through the speaker. Sound continues to loop through the system, and with each pass the volume increases until the limit of the amplifier is reached. All of this happens quickly, and the result is both loud and annoying.

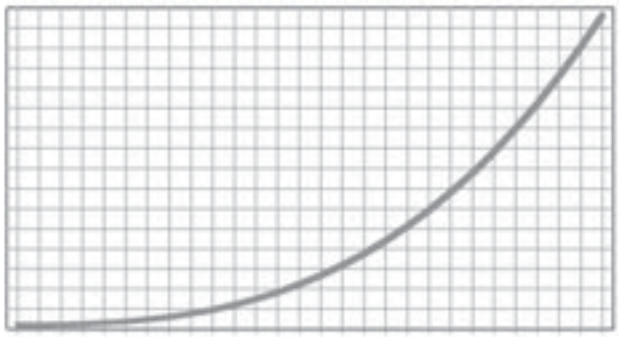
> ***In some seasons, trend following is good; in others, reversing is good. The problem is how to differentiate the seasons in advance.***
>
> **Victor Niederhoffer, *The Education of a Speculator***

Another, less common example of positive feedback is the nuclear "chain reaction," in which particles released from one area of nuclear material release a greater number of particles from areas nearby. The process accelerates rapidly until the whole mass is involved. The result is explosive.

A spreading fire is another example. A discarded match ignites the carpet. The fire spreads to the curtain, then up the wall. Quickly the whole room is in flames, and soon the entire house is burning.

In each of these cases an *accelerating trend* continues until some limit of the system is reached. The amplifier peaks out, the nuclear material is spent, or all nearby fuel in the house is burned up. Positive-feedback systems exhibit accelerating trends.

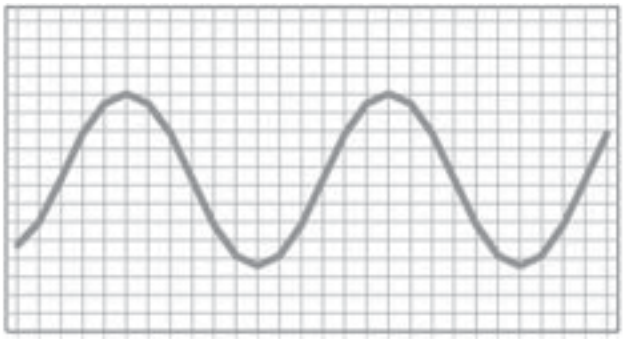
Figure 1
Positive Feedback = Acceleration



A good example of negative feedback is the thermostat, which cools a room as ambient temperature rises and heats as temperature falls. The thermostat stabilizes room temperature within a comfortable zone. Another example of negative feedback is the engine governor, commonly used to stabilize the output of industrial engines.

An interesting example of negative feedback is the predator-prey relationship. An increase in the predator population tends to put pressure on the prey population. However, a fall in the number of available prey reduces the number of predators who may feed successfully, and so the predator population declines. A decline in predators, in turn, boosts the prey population, and so on. The interaction of predator and prey tends to stabilize both populations. Negative-feedback systems are stable systems, with values fluctuating within a narrow range.

Figure 2
Negative Feedback = Stable (Cycle)



Feedback in the Market

When traders respond to market events, they are closing a feedback loop. The actions of individual traders collect to produce changes in the market, and those actions prompt a collective response. Sometimes traders' aggregate behavior is amplified through positive feedback. In the case of positive feedback during a rising market, rising prices trigger net buying on the part of the aggregate trader. Net buying lifts prices, and higher prices, in turn, generate more buying. An accelerating advance results. Positive feedback in a falling market, on the other hand, develops when lower prices induce traders to sell. Net selling pushes prices down, and lower prices, in turn, encourage additional net selling, and so on, producing an accelerating decline. Positive feedback, when it occurs, produces a trend. Traders' aggregate behavior during these periods may be characterized as 'trend-following' (see Figure 3).

Figure 3
Positive Feedback

At other times feedback between market inputs and traders' aggregate response is negative. When negative feedback prevails, the composite trader reacts to rising prices by taking profits. That net selling puts pressure on prices. However, falling prices encourage traders to hunt for bargains among depressed issues. A strong bid for weakened stocks pushes prices higher again, and the cycle repeats (Figure 4).

Figure 4
Negative Feedback

When negative feedback drives traders' response to price change, price action tends to be choppy or corrective. Traders' behavior during these periods may be characterized as 'contrarian'.

A New Model of Relative Strength

Markets are risky. And risk, everyone knows, involves loss, or the possibility of loss. The connection we all make between risk and loss is intuitive and powerful. Because the probability of equity loss is greatest when markets are falling, a stock's ability to defend against loss is most critically tested, and therefore best measured, during periods of general market decline.

But rising markets are risky, too. Regardless of how well a stock defends against loss during falling markets, if it does not score gains as the market rises, the trader is subjected to another risk, lost opportunity. Because the probability of opportunity loss is greatest when the broad list advances, a stock's offensive qualities are best measured when the market is rising.

Picturing Offense and Defense

Webster's Dictionary defines a benchmark as a "standard or point of reference in measuring or judging quality, value, etc." A benchmark may be a published market index or the average performance of a universe of targets (stocks, groups, etc) under analysis. For our purposes, two benchmarks are required, one to measure offensive performance and the other to measure defensive performance. To accomplish this, the average daily performance of a universe of stocks is separated into two sets of returns. The first set includes only those days when average performance was either positive or flat. That set of returns makes up the offensive benchmark. The defensive benchmark is built from the balance of the daily returns, those during which average performance was negative.

Each target within the universe is compared separately to both offensive and defensive benchmarks. To produce an offensive score, the sum of the offensive benchmark's daily returns (flat-to-rising days) over some period—say, 100 days—is divided into the sum of the target's returns for the same days and over the same period. If the result of that calculation is 110, then the target is ten percent stronger than the benchmark on those days when benchmark returns are flat-to-rising. The target has an offensive score of 110.

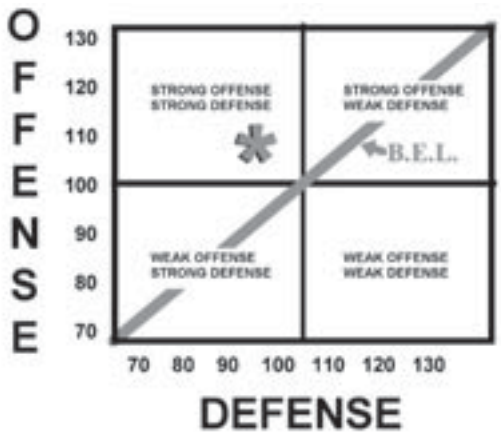
A similar calculation is made to determine defensive relative strength. The sum of the defensive benchmark's returns on negative-return days is divided into the sum of the target's returns for the same days. A result of 110 in this case indicates that the target is ten percent weaker than the defensive benchmark.

Offensive and defensive performances of a target are pictured graphically in Figure 5. The vertical axis displays offensive performance. The offensive benchmark is indicated by a horizontal line that divides the vertical axis equally. A score above 100 indicates that the target's cumulative return during positive-return days exceeds the offensive benchmark's. A weak offense under-performs the benchmark and earns a score below 100.

The horizontal axis shows defensive performance. A vertical line bisecting the matrix designates the defensive benchmark. A strong defensive score of less than 100 places the target to the left of the vertical benchmark. A weak defense generates a defensive score above 100 and locates the target to the right of the vertical benchmark.

A target in the position marked with an asterisk (Figure 5) has an offensive score of 110 and a defensive score of 95. This target has out-performed the benchmark both offensively and defensively.

Figure 5



The Benchmark Equivalence Line (BEL)

Notionally, there are infinite combinations of offensive and defensive performance that match the overall performance of the average stock (benchmark). These combinations range from very weak offense plus very strong defense to the other extreme of excellent offense together with very poor defense. All possible combinations of offense and defense that tie the universe's average performance comprise the Benchmark Equivalence Line (BEL).

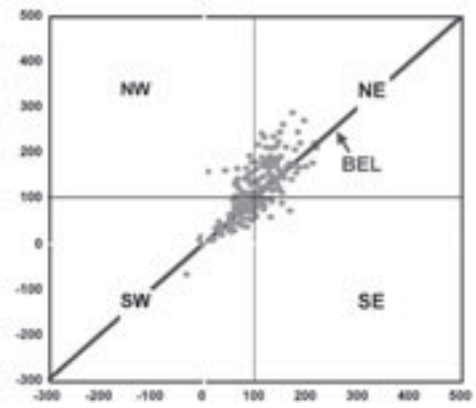
A target with an offensive/defensive score of, say, 110/110 has rallied ten percent more than the offensive benchmark during rising periods. The target has also fallen ten percent more than the defensive benchmark during declining periods. When offensive and defensive performances are combined, overall performance of the target matches the average performance of the universe. The target is simply more volatile than the benchmark. Similarly, a score of 90/90 matches average performance, but in this case the target is less volatile than the benchmark. The original benchmark (100/100) at all volatilities comprises the BEL. The BEL is shown in Figure 5 (above) and forms a straight line that runs diagonally through the matrix.

A target's location anywhere northwest of the BEL indicates that combined offensive-defensive performance is better-than-benchmark, while a location to

the southeast of the BEL marks worse-than-benchmark performance. The further NW of the BEL, the more a target's performance has exceeded benchmark performance. The further to the SE, the more a target has fallen short of the benchmark.

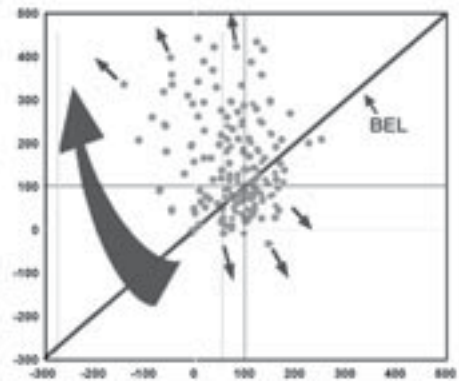
The next chart (Figure 6) pictures a universe consisting of the Standard & Poor's 100 plus the NASDAQ 100 as of mid-December, 1998. The market has suffered through a sharp summer decline, and confidence in the new advance is still weak. Traders are risk-averse and contrarian. Relative strength differences (NW-SE) are small and eclipsed by differences based on volatility (SW-NE). As a result, stocks hug the benchmark and arrange themselves along the BEL.

Figure 6
How Positive Feedback Expands the Universe
December 15, 1998



During periods of positive feedback, traders buy into strength and sell into weakness. Whether the overall market is rising or falling, capital flows from weaker to stronger issues. As the process continues, relatively strong stocks become even stronger and relatively weak stocks become still weaker. The period from December 1998 through March 2000 marks a period during which traders' aggregate behavior was dominated by trend following. Traders engaged in a virtuous positive-feedback cycle that drove the strongest stocks to new extremes of relative strength. Laggards rallied, but not as well as the average stock, and so continued to drift below the BEL as their relative strength declined. Figure 7 shows the 200-stock universe in March 2000, near the end of that expansion phase, and pictures the flow of capital from weak targets SE of the BEL to stronger targets NW of the BEL.

Figure 7
Capital Flow During Positive-Feedback Periods
March 13, 2000



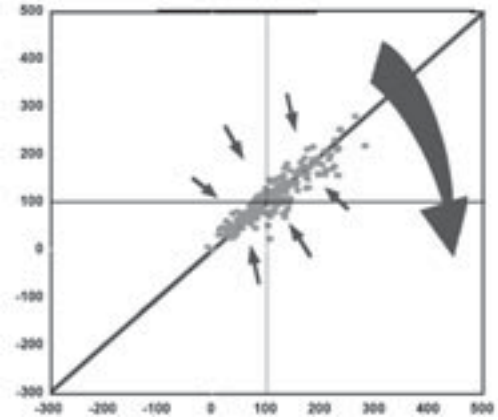
When feedback is positive, capital is pumped into strong targets NW of the BEL, and so the relative strength of those targets tends to improve. As relative strength improves, strong targets migrate toward the NW. On the other hand, relatively weak targets are drained of capital and so become relatively weaker. Weak stocks move to the SE and further away from the BEL. Positive feedback in both rising and falling markets produces a northwesterly flow of capital and causes the universe to expand.

As the universe expands, the strongest stocks push well into the NW quadrant. Movement toward the NW indicates that relatively strong stocks are not only outpacing the benchmark during advances but also finding exceptional support during weak market periods. Improvements in both offensive and defensive scores provide evidence that these stocks are under active sponsorship.

How Negative Feedback Contracts the Universe

During periods of negative feedback, capital flow across the BEL is reversed. In the aggregate, traders have turned from trend-following behavior to contrarian behavior. Traders buy only once stocks are considered cheap, and profits, when they come, are taken quickly on rallies. As a result, trends are not durable, and price action is range-locked or corrective.

Figure 8
Capital Flow During Negative-Feedback Periods
November 8, 2002



Driven by negative feedback, capital flows out of stronger issues NW of the BEL and into weaker stocks to the SE. Stocks that have been strong lose relative strength and fall back toward the BEL. On the other hand, stocks with a recent history of weakness, pumped by an infusion of capital, migrate in a northwesterly direction toward the BEL as relative strength improves. Negative-feedback periods produce a southeasterly flow of capital and cause the universe to contract. Figure 8 shows the universe in November 2002, near the end of a long contraction phase, and pictures the flow of capital under negative-feedback conditions.

Confidence

The current of capital alternates back and forth in a cycle repeated over and over as the universe of stocks expands then contracts. But what is it that prompts traders, as if with one mind, to push stocks to relative-strength extremes before pulling them back toward the benchmark?

It is confidence in the trend.

It takes confidence to buy into strength and to let profits ride. When traders, for whatever reasons, become confident of a bullish trend, they defer profits and chase strong stocks into new high ground. Stocks that do not participate in the trend are ignored or sold. Trends accelerate, and profits, for those trading with the trend, come easily.

On the other hand, when traders are confident of a bearish trend, the weakest stocks are liquidated or shorted aggressively, and proceeds are held in cash or shifted to stronger stocks that defend well in a falling market. Trends are durable, albeit negative, and traders willing to sell into the trend are rewarded.

In either case, confidence in the trend leads to trend-following behavior. The controlling dynamic is positive feedback. Relatively strong stocks outperform weaker issues, and the universe expands.

The dynamic is quite different once traders lose confidence in the trend. Risk-averse and contrarian, traders respond negatively to price change. Buying is focused on oversold "bargains," and profits are taken in stocks that have rallied. Trends are short-lived and unreliable, and profits are elusive. Stocks with a recent history of relative strength fall back toward the BEL while laggards improve, and the universe contracts.

Red Shift

There is a shift of color toward the red end of the spectrum in the light emitted by the most distant galaxies. Astronomers cite this as evidence that these galaxies are moving away from us at the fastest speeds as the universe expands.

Something like that happens in a universe of stocks. During bullish expansions, the strongest stocks, those furthest from the BEL, book the strongest forward gains. Perhaps stronger relative strength attracts greater demand from trend-following traders. In any case, the best immediate gains during such periods are most likely to come from targets near the furthest extreme of relative-strength.

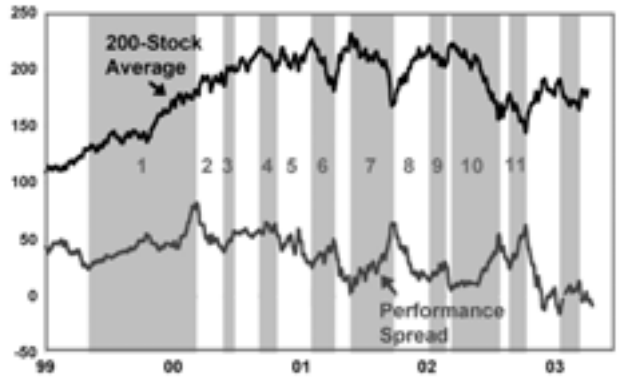
Similarly, during bearish expansions the best short profits are likely to come from the weakest stocks and groups. Even during contracting markets, the best opportunities on the long side are consistently provided by the most laggard issues. Generalizing, the most profitable opportunities consistently come from targets furthest from the BEL.

The Spread

The spread in performance between relatively strong and relatively weak targets offers a running picture of expansion and contraction. The Spread is calculated as the difference in forward performance of relatively strong vs. relatively weak targets. One may choose to compare the average forward performance of all targets NW of the BEL with that of all targets SE of the BEL. To make the comparison, all targets NW of the BEL on day d are identified, as well as all targets SE of the BEL. Then the average performance for each set of stocks on the following day (d+1) is calculated, and the difference between the two averages is determined. The resulting number is the daily performance spread between all strong and all weak targets. Daily spreads are cumulated to create The Spread.

The next chart (Figure 9) shows both the average performance as well as The Spread of the 200-stock universe from January 1999 to April 2003. Periods during which The Spread rises indicate an expanding universe driven by positive feedback. Traders are confident in the trend and their behavior is characteristically trend-following. Trends develop momentum and persist. Periods during which The Spread rises are shaded.

Figure 9
200-Stock Average vs. The Performance Spread
January 1999 to April 2003



Unshaded areas bracket periods during which The Spread fell, the universe contracted, and traders were risk-averse and contrarian. Market action is turbulent and long-lasting trends are hard to find. In this whipsaw-prone environment, even tight risk-control may not save the trader from accumulating outsized losses.

There is, however, one notable exception to this dreary contrarian outcome: after a significant decline, oversold, volatile laggards rise fastest during the initial phase of a new advance. During these periods, contrarian long positions in laggard issues are likely to produce superior short-term profits. But for this one exception, a falling Spread is a signal for caution.

The generally rising trend of the Spread from the spring of 1999 through March 2000 (shaded area 1, Figure 9) indicates that the universe of stocks was expanding throughout a long positive-feedback cycle. Traders favored relative-strength leaders, and the most profitable strategy was to own the strongest stocks and groups.

Despite the continuation of a bull market in prices, the Spread's sharp decline in March of 2000 (2) warned that traders had lost confidence in the rising price trend. The fact that prices continued to advance during this contrarian period suggests that traders attempted to reduce risk, not by moving to cash, but by replacing bulled-up leaders with laggard issues.

During period 3 The Spread recovered as prices continued to rise, but by period 4, during which the average fell as The Spread rose, it was clear that momentum had tipped to the downside. Traders were gaining confidence in the declining trend.

Period 5 shows a typical contrarian pattern. Price moves irregularly within a trading range.

Period 6 offers traders the first good opportunity to trade the short side in synch with the trend. The average stock fell as The Spread rose, our indication that positive feedback was operating in a declining trend. Under these conditions, weak stocks fall faster and further than stronger issues, and the best strategy is to sell or to sell short relative-strength laggards.

Another big wave of selling is supported by a rising Spread in period 7. Momentum, as measured by the trend of The Spread, is now quite strong, and prices tumble to new lows.

A solid contrarian rally featuring oversold laggards (8) returns the average to long-term resistance. Early in a contrarian rally, as The Spread begins to dip and the average stock begins to advance, the best strategy is to buy volatile laggards in the expectation of good, though likely short-term, profits.

After that corrective rally, the average declines again in three consecutive waves of selling under increasing momentum (9, 10 and 11). Since mid-2000, periods of downside momentum have been progressively longer, and prices have fallen further with each event.

The Spread discloses the direction of capital flow within a universe of targets and offers a new and precise definition of 'momentum'. Traders may use

The Spread not only to identify profitable trending periods but to avoid difficult markets as well. Indeed, these indications are consistent enough to support reliable trading rules. Those rules are listed below:

1. When The Spread is rising, and relative-strength leaders are advancing, buy the strongest stocks and groups;
2. When The Spread is rising, and relative-strength laggards are declining, sell or sell short the weakest stocks and groups;
3. After a decline, if The Spread is falling and relative-strength laggards are advancing, buy the weakest stocks and groups.

Testing The Spread

A protocol was devised to back-test the efficacy of The Spread. To isolate the effect of The Spread, simultaneous long-short trades were assumed in order to neutralize the impact of market direction. The sole pre-condition for trades was the immediate direction of The Spread.

Figure 10 summarizes five separate computer back-tests of a market-neutral strategy based on the direction of The Spread. The method employed is simple, direct and free of any attempt to optimize outcomes. The Spread is used to determine whether the universe of 200 stocks is expanding or contracting. If The Spread rises (universe expands), long positions are selected from relatively strong stocks and short positions are selected from relatively weak stocks. Positions are reversed when The Spread falls (universe contracts). The net percentage change for the following day (close to close) resulting from long and short positions is cumulated. No leverage is assumed.

No allowance is made for commissions or other costs. As with any back-test, results are theoretical and are intended only as a demonstration of the validity and power of the methods developed in this paper.

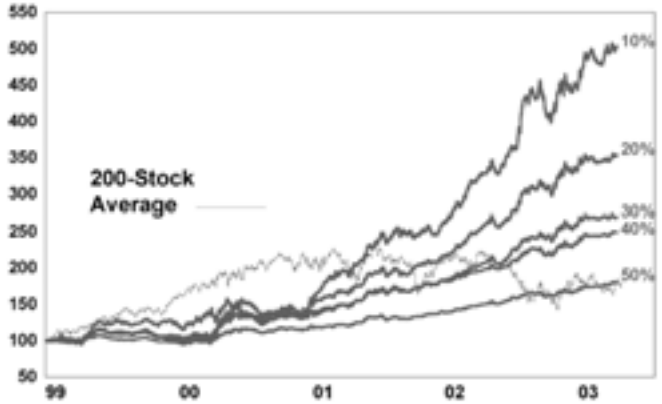
The back-test was made assuming stock sets of varying size. "10%" tags the overall performance that results from trading only the strongest and the weakest ten percent of the universe. That set posted a gain of 404% with a maximum draw-down of 14%. Over the same period (4.3 years), the 200-stock average gained 69%, with a maximum draw-down of 39%.

Set size was increased incrementally by ten-percent until the relatively strong half of all stocks were positioned on one side of trades and the relatively weak half on the other ("50%"). Each set tested scored a higher net gain and a smaller maximum draw-down than the 200-stock average.

The best overall performance came from the set of stocks (10%) nearest the two relative-strength extremes of the universe. This result is consistent with the "Red Shift" phenomenon discussed above.

Figure 10

Market-Neutral Results vs. 200-Stock Average



Postscript

Markets make sense. Price series are not chaotic, but are carried along on currents of underlying capital flow. As we have seen, those currents may be observed through their effect on price. Moreover, a proper reading of capital flows can lead to consistent trading success.

Skeptics hold that operations based only on observed price changes cannot succeed. Markets are moved by news, they argue, and since, by definition, news cannot be predicted (or it would not be news), price movement cannot be anticipated. It is a short step to conclude that price data are not linked and that price series follow a random walk.

Skeptics fail to take into account that price activity is also news. As we have noted, traders respond to news of price change, just as they respond to other sorts of news. By their collective response traders forge causal links between past price data and current price movement. Price data are linked because traders link them.

Granted, markets are the free and spontaneous creation of buyers and sellers motivated only by insular self-interest. Yet the whole of their activities assumes a shape and flow beyond the intent of any individual trader. Out of the chaos of daily trading, something new, orderly and recognizably human emerges. At bottom it is hope and fear, measured by the rhythms of expansion and contraction in a process as relentless and as natural as breathing or the beating of a heart.

Biography

Gary Anderson has been a principal of Anderson & Loe since 1990. Over that period, Gary has provided stock market consulting and advisory services to an international clientele of professional asset managers, including banks, mutual funds, hedge funds and financial advisors. Gary's work has been featured in Barron's (October 1994), and his work has been published in *Technical Analysis of Stocks and Commodities*. Gary publishes a weekly comment, *Equity Portfolio Manager* (equitypm.com), and he is the primary author of *Traders Boot Camp* (tradersbootcamp.com), an online educational service. Gary has a BS in Philosophy from Stanford University and attended University of California Berkeley graduate school.

Elliott Wave Heresy: *Five Waves Followed by Three Waves is Not Always Right!*[1]

2

Steven W. Poser

The Elliott Wave Theory (EWT, also known as the Elliott Wave Principle) suggests that markets move in five wave impulse moves with the trend, which are inexorably followed by three wave corrective patterns. Many novices already fail to understand the fact that this means that five wave price patterns occur with the underlying price trend, whether that trend is to higher or lower prices. However, the author shows that even with this added information, the supposition that a never-ending spiral of five-wave/three-wave couplets is not always the correct way to view the markets.

Elliott Does Not Require Prices To Rise Forever

Why is there still a bit of controversy over applying Elliott outside of the stock market? Most of it is because those who are not particularly well versed in Elliott still believe that a market must continuously and forever traverse five waves up and three waves down. If that is the case, then it seems a bit difficult to apply Elliott in a very meaningful manner to the bond or currency markets. This thinking is patently incorrect. If the market has completed a full five-wave cycle and reached a new high, then we look for retracements back to zero, not just the latest five-wave cycle. The common complaint that Elliott requires ever higher prices over time then breaks down.

Although I do not necessarily agree with some of the more dire forecasts for U.S. equities going forward, the mere fact that the actual Elliott reasoning would permit the Dow to tumble more than 90 percent, should remove the general belief that prices must rise forever for Elliott to work. Although it is certainly true that even if the Dow fell to 1,000, that is more than double the high set in 1929 and 25 times the 1932 low; that also would represent a loss of more than 90 percent from the highs set in 2000 by the venerable index and would mean that from trough to trough the annualized return would be less than 5 percent per annum. After inflation, that gives us a 2.5% annual return, which likely barely covers technological innovation.

A similar view has allowed the Nikkei 225, the Japanese stock market index, to fall more than 80 percent from 1989 through 2002.

In this author's opinion, there remains a weak link in how Elliott Wave patterns are typically dea\scribed. Although price action with the trend is correctly shown as developing in five waves, this leads to a major disconnent in the classic depiction of the stock market. That is, the price action still must be shown as five waves higher and three waves lower, and all price action must be linked over centuries to show a complete picture. Unfortunately, price history does not go back that far, so prior authors have estimated true stock market activity by linking the U.S. stock market to British equities. They reasoned that prior to some point in time, the British economy was the world's largest and was thus a fair representation of "the" stock market. I am not convinced that it would even have been fair to depict the U.S. stock market as "the" market during its heyday in the late 1990s. Although well considered, given the overall basis for what EWT truly represents, the break points where the analysts choose to move from one index or currency to another also lead to a discontinuity in what the charts actually represent.

Elliott Wave Theory, as is the case with all chart analysis, represents a sum of the thinking of the crowd of investors and traders at any given moment for that particular market. Even in this day and age of speed-of-light global communications, the various national stock markets do not move in lockstep, nor do their fixed-income markets. Currencies gyrate, moving up and down relative to each other. Although the general direction is often similar, the magnitude of daily, weekly, and monthly changes varies wildly. The German DAX fell more than 70 percent from its peak in 2000 to its low in early Q4 of 2002. The U.S. Dow Jones Industrials had still not lost even 40 percent of its value, the U.S. S&P 500 was down 50 percent, and the U.S. Nasdaq Composite had shed more than 75 percent from its peak value. Given these wide differentials, I find it very difficult to substantiate any concatenation of U.S. stock prices to British stocks, especially during a time when the global economy was far less homogeneous than it is right now.

The author believes that a slight modification of how waves are characterized eliminates the problems introduced by an unfailing dedication to a never-ending series of 5-3-5-3 moves. Remember, R.N. Elliott developed his methodology based on the stock market. He really did not have extensive long-term price data. Stock prices have tended to rise over time. This was and is likely to remain the general trend for equity valuations. Some have posited that stock prices rise due to inflation-that is, prices tend to rise over time. Although we have certainly lived in a mostly mildly inflationary environment, there have been substantial bouts of deflation in recent history and Japan has seen generally falling prices for nearly a generation now. Inflation is not the answer.

Explaining Rising Equity Market Prices: It's Not Just Inflation

Stock market prices have risen for hundreds of years in general. Although product and services prices have risen as well, inflation does not provide a sufficient reason for the higher stock market valuations. Consider that high inflation often results in economic slowdowns. When prices are rising, wages typically lag inflation. When this occurs, the stock market tends to pull back rather than rally. Although this is not true during periods of hyperinflation, such as has been witnessed in some of the South American stock markets, those economies, which are often largely dollar-based, have not risen in dollar terms and still have risen less than underlying inflation. Unlike the somewhat arbitrary decision to switch from British to U.S. indices, applying a currency-based adjustment to economies in which many spenders hoard foreign currencies as a hedge against inflation, the value of the index in another currency's terms may make sense.

Even if inflation was a factor in stock market prices, that would not make equities special in their application to Elliott. Inflation also affects the bond market-high inflation raises interest rates and causes lower prices. Investors require higher interest rates if inflation accelerates when they lend money-which is what they are really doing when they buy a bond-since the value of their principal lent decreases as inflation increases. The relative inflation level from one currency arena to another is also believed to have an effect on exchange rates through purchasing power parity.

What is different about the stock market, as compared to the bond market, commodity market, or currency market? Less than you might think is the real answer. A major underlying cause of generally higher stock market prices has been technological innovation. Technological innovation allows companies to be more efficient in their production of goods and services. This will tend to widen the spread between what it costs them to produce a product or service and what they can charge for that product or service.

Technological innovation can also has a negative effect, at times, on commodity prices. As it becomes cheaper to produce a raw material, more competition enters the market, increasing supply. Unless demand increases as well, prices will fall. In the case of true technological innovation, prices might not fall if the competition cannot match the technology. Technology may also be behind the fall in inflation (also known as disinflation) in recent years as new

products offer more perks for the same money or less. The method that most governments employ to compute inflation leads to deflationary-appearing statistics, since the governments attempt to compare like products. Any improvement to a product is thus discounted from a product's price, even though the final cost to the consumer may be unchanged. For many years, the introductory price for a well-equipped personal computer system hovered near $2,000 even though prices for older components fell substantially.

This gave a misleading impression of falling prices even though, to run the most current and advanced applications, you would have needed to regularly upgrade your computer for the still standard $2,000 price tag. In the end, higher productivity due to innovation does tend to increase the value of the manufacturer, which in turn raises the firm's stock price. This is the only place where innovation has a direct and immediate impact. Since the trend, for hundreds of years, has been to innovation, recently at an accelerating pace, the general trend in stock market prices has been higher. This has resulted in what I believe to be the incorrect assumption that upward price adjustments are always five-wave patterns, whereas bear markets must always develop in three-wave legs.

The 1929-1942 Depression Era Triangle

The thinking discussed above has resulted in many Elliotticans coming up with difficult-to-stomach wave counts for the period just prior to, during, and after the Great Depression. I have seen this period deemed a triangle. This is something I have a very hard time with. While one might be able to make a pattern-based argument for the triangle theory, it does not fit in with what a triangle is supposed to mean-typically, a continuation pattern of a larger trend. Although prices ultimately did return to their upward trek, to call the Great Depression a consolidation does not in any way, shape, or form meet the crowd theory and sentiment-based analysis that is the ultimate framework for any type of technical analysis. The 1929-1942 period was not a minor correction. It represented a cataclysmic shift in how people lived, how governments protected their citizens, and how equity assets were priced. Although one can invoke the fractal nature of price movements, as explained by EWT, the sentiment part of the story still doesn't fit. There is no justification, from that perspective, no matter what the chart looks like, to call that period a triangle.

The basic premise for EWT has been, in the case of the stock market, that bull markets developed in five-wave patterns and bear markets in three waves. What does one do in the currency markets? Price action which is bullish for the U.S. dollar is bearish for the Japanese yen. One idea I've seen floated is to use the currency of the larger economy. What happens when the economies are similar in size? And, why should you use the larger currency? Maybe it should be the more volatile currency, since that is what would, by definition, drive most of the exchange rate's price variation? In the case of bond yields, there is absolutely no reason to use five waves up for bull periods and three waves down for bearish periods. There is no general multigenerational direction for interest rates that I can see. They rise and fall in a cyclical manner. I can see no reason to believe there should be a long-term evolution in any particular direction for interest rates.

Elliott Waves for All Markets

After considering these many factors for many years, I have come to an interesting conclusion. This idea is not wildly different from work published by Tony Plummer[2] back in 1991. He suggested that prices mostly moved in three-wave patterns, but allowed for five-wave moves in certain situations, which roughly equated to the conditions as they might apply to an EWT-based impulse move. My main point of deviation from what Mr. Plummer suggests simply places the five-wave move as a major part of the market's framework. Human nature appears to take longer to recognize a major trend, so when it occurs, it seems to take five waves for it to complete. Therefore, price action with the trend will normally develop in a five-wave pattern. However, corrections against a dominant trend should complete in three waves, or via a triangle.

Note that this does not preclude use of zigzags in your analysis. A zigzag is a correction, but the a wave and the c wave represent the price action at that moment in that degree as being the current trend. There is no reason why one or both legs in the direction of the current trend cannot develop in five waves. However, if the trend of next larger degree had reversed, then I would expect the general direction of prices to result in five-wave patterns in the new direction and three-wave patterns against it. This does not really change anything. As long as technology advances and mankind does not bomb itself into oblivion, I would expect that equity market prices will continue in their long-held 5-3-5-3-5 bias of generally rising prices. However, if disaster ever befell the world to the degree that innovation halted for a period of generations, I would expect that five-wave patterns would develop in the direction of lower prices. If there had been an active and documented stock market during the Middle Ages, I would have expected to see three-wave cycles to higher prices and five-wave cycles to lower prices. If Elliott was alive at that time, he probably would have concluded that bear markets trace out five-wave patterns and bull markets complete in three waves.

This idea also fits almost perfectly with the way prices seem to develop in the bond and currency markets. When there is no strong overriding trend, prices should both rise and fall in three-wave patterns. This would roughly relate to range trading, double threes, triple threes, triangles, and other consolidative ideas within a standard Elliott Wave framework. As soon as a more lasting trend develops, prices should start to trace out five-wave patterns in the direction of the larger trend, and should correct that trend via three-wave price action.

The main difference I propose from classical EWT is that if the underlying trend was to reverse, I would expect price developments in the opposite direction to show a 5-3-5-3 pattern. This means that you might not always be able to link moves from one period to the next, with or without X waves. It does not make applying the Elliott Wave Theory any more difficult. When these changes occur, they will be due to major and possibly cataclysmic alterations in the way the world, individual nation-states, or geopolitical areas exist and behave. Most reasonable time frames will see patterns develop as they always have. The tools you already use-trend lines, Fibonacci extensions, moving averages-will continue to work. Even retracements will apply, although you might need to change exactly what it is you think you are retracing, and you will have to understand that "something is different this time" so that you look for the proper wave count on a larger scale.

There are other instances in which this idea also holds. Consider a company that has built up a strong and successful business over many years. It shows steady growth and technological innovation throughout. Then, it misses a beat, or actually, a whole symphony. The technology in which it specialized no longer is favored, and it is late to the ballgame in the new favored technology. The firm's management either never reacts, or reacts too late. The price reversal for that stock will not appear as a bear market at all. There should be no reason to believe that the change in direction is a correction of previous excesses. The trend for that firm is fundamentally down. That means you should look for losses to develop in five waves and not in three. Corrections or bull periods for that stock will then trace out three-wave patterns-unless the company rights itself and successfully purchases or develops innovations that permit it to prof-

Figure 1

itably compete in the new business world.

There are two recent examples of this situation. One is Polaroid Corporation (see Figure 1), the venerable instant camera company. Polaroid's cameras never competed favorably with standard film, but were used mostly by amateurs who wanted immediate gratification or maybe wished to give an immediate gift to Grandma and Grandpa. Sadly, this American icon of ingenuity never reacted to the digital age and did not properly perceive the threat from digital cameras, which could not only provide the same instant response, but also permitted the owner to touch up the picture and remove annoying things like red-eye or poor exposure. When that seismic shift took hold, the true trend was down for the stock, and its losses had to develop in five waves. Also note how, even as the price of Polaroid's shares trebled from 1990 to its high in 1998, the pattern was sloppy, at best-three waves. The story has been similar for Xerox Corporation.

Another high-growth stock from a previous generation, Xerox also failed to properly react to and embrace the new digital economy. While many stocks soared into the year 2000, Xerox tumbled more than 70 percent from May 1999 through December 1999 in a clear five-wave pattern (see Figure 2). After a brief rally into March 2000, it collapsed again, tumbling more than 80 percent from its minor recovery high before the year was out. By December 2001, in less than 19 months, Xerox's share price tumbled to as low as $3.75 from an all-time high of $63.94.

Figure 2

As of late 2002, there had been some promising signs in terms of Xerox's price patterns. While most stocks sank to new lows on multiple occasions throughout 2002, Xerox only fell as low as $4.20 in October 2002. The pattern down still allows for one more new leg lower, but the divergence in performance between Xerox and the overall market bodes well for the firm. It is too soon to tell whether the ultimate bottom of the stock is in or not, and whether the next major move higher will be in five waves or three. However, for the time being, a five-wave fall is countenanced by the change in fundamentals. If the company manages to find its way back into the pack, there would be no reason why the next uptrend could not see the stock return to the typical five-wave pattern higher and three waves lower, even though it would mean that a five-wave pattern lower developed on its own, without another matching five-wave cycle. Remember, five-wave patterns, based on standard Elliott rules, cannot stand alone except when they are part of wave C of a 3-3-5 correction or consolidation.

The one problem with this approach is that you must depend on your understanding of the asset under study if you are going to have a clue as to whether you should be looking for a reversal after three waves, or a fourth and fifth wave. This is one reason why I do not recommend using a purely technical approach to the markets. Whether it is the simple act of being informed as to when a company is due to release earnings or the government is set to announce quarterly gross domestic product (GDP) or monthly employment data, the investor or trader who does his or her homework first can be prepared to not just react, but to be proactive in the face of what could otherwise become an adverse situation.

Figure 3

What actually is quite fascinating about this approach is that it also can give you further insight into the global fundamental situation. Consider the quarterly chart shown for the USDJP¥ (U.S. dollar-Japanese yen) exchange rate in Figure 3. Although the dollar has been moving sideways to higher vis-à-vis the Japanese currency since early 1995, the gains have appeared to be wholly corrective. Although wave counts still suggest there is room for the American currency to rally past JP¥160 in the next two years, there is little or no evidence to suggest that the dollar will not fall to new lows versus the yen in the next 5 to 10 years.

If the dollar had shown more strength or given a hint of an impulsive rally, I would be willing to forecast that something had changed, that we should look for five-wave rallies higher for the USD versus the JP¥, and that the bottom in 1995 represented the end of a secular USD downtrend versus that currency. It certainly would have been very easy to make that pronouncement. After the world spent a generation lauding the Japanese way of doing business, it discovered that the Japanese were fallible as well. A severe bubble in real estate and equity markets sent the Japanese economy into a tailspin that was still active some 13 years after the stock market topped there. While U.S. and other equity markets rose 20 percent per annum in what is called the greatest bull market ever, Japan's equity market sank into near oblivion.

Ethnocentric and patriotic breast-beating could easily lead the uninformed observer to suggest that the Japanese way of doing business was wrong after all and that America, or at least the West, had the "right" way. I am certainly not making any political or ethnic statements in these pages, but rest assured that the long-term uptrend for the yen remains firmly in place. While the U.S. dollar may very well double or triple from new lows due late in this decade or early in the next, I do not see a fundamental reason to believe that the very long term-oriented investor should be proclaiming victory versus Japan Inc.

As you can see, there is a lot you can tell from a chart. Admittedly, it would be impossible to come up with the above brief analysis without understanding the geopolitical climate, as well as something about international trade and both the Japanese and American economies. The analyst needs to understand both the technical and fundamental underpinnings of the U.S. and Japanese economies and their stock markets. That my forecast still calls for substantially lower prices in U.S. equities in the next five years, even as Japan's stock market finally bottoms, adds to my confidence in the above analysis.

Attendant to this new approach is a need to understand the world around you. The Elliotticians or technical analysts can no longer fool themselves into believing that they can just look at the charts and divine what is about to occur.

A thorough understanding of what you are analyzing and of the factors that move those markets is of paramount importance. Unfortunately, by removing one of the foundations of EWT, it would seem that I am removing something that all analysts could count on: the alternation of five-wave and three-wave cycles. Although technically that may be true, note that many charts that do not use this principle have wave counts that require all sorts of questionable tactics to work out properly. They typically do not fit at all with a reasonable market psyche or sentiment, nor do they appeal to the actual condition of the market they are tracking. Since, at least to the author, that is one of the great strengths of EWT, failure to apply it that way is a far greater problem than a revision that actually only comes into play when there is a major change in how a market works.

Of course, the great danger with this kind of thinking is that you will use such actions to say that "it is different this time." It rarely ever is. I do not envision a return to the dark ages of civilization, or negative technological innovation, which would be required to remove the 5-3 bias in equity prices. Other, more cyclical markets are likely to stay that way, keeping their large wave patterns mostly a series of three-wave moves. This revision also fits far better with the author's idea that EWT is a tool and not the Holy Grail. The successful Elliottician should employ Elliott along with classical technical analysis techniques, sentiment analysis, and fundamental research in producing superior trading and forecasting results.

Footnotes

1. *This paper is adapted from "Applying Elliott Wave Theory Profitably" by Steven W. Poser, published by John Wiley and Sons (August 2003)*
2. *Plummer, Tony. (2001). Forecasting Financial Markets: Technical Analysis and the Dynamics of Price. New York: John Wiley and Sons*

Biography

Steven W. Poser is President of Poser Global Market Strategies Inc., a financial advisory firm. Mr. Poser is the author of "Applying Elliott Wave Theory Profitably" and is regularly quoted in the financial media. His firm consults to institutional and retail investors, providing training, market forecasting and alternative risk measuring services in the stock, bond, currency and commodity markets. Steve has a BA in Mathematics and Computer Science from New York University (NYU), an MBA in Economics from Pace and has a Post-MBA Certificate in Finace from NYU.

He can be reached via his web site: www.poserglobal.com

Elliott Waves Vary Depending on the Time Frame and Direction of the Pattern

3

Rich Swannell

Liquid markets do not move at random. Understanding this can facilitate more accurate market forecasts. Followers of Elliott have always known that the consequences of emotions as they play out in the market are far from random. In fact, the consequences or price movements are patterned. These patterns are based on the Wave Principle. The Wave Principle defines about a dozen common patterns found in the price data of liquid markets. By identifying the beginning of common Elliott patterns, it is possible to calculate the probability of those patterns completing, and thus, where and when the market is likely to change direction. However, until now, no follower of Elliott has known the exact probability of a market turning at any given price and time

Liquid markets are, by definition, traded by a large crowd. Although it is nearly impossible to determine what a single trader will do, it is possible to determine the statistical probability of what a large crowd of traders will do. This so-called mass psychology swings back and forth like a pendulum, as mass human emotion oscillates between optimism and pessimism. When the Elliott Wave Principle is applied to highly liquid markets, it has been proven to be uncannily accurate in identifying the changes in mass human emotion, and it thereby reveals the key turning points in the market.

Liquidity is not only essential for consistent Elliott behavior; it is a prerequisite. Stocks such as those on the S&P and NASDAQ, for example, often display strong and dependable Elliott Wave patterns. These markets are driven by mass psychology, or human emotion. No individual trader, institution, or government can manipulate these markets. They are truly liquid, driven by supply and demand - the result of the "state of mind" of the crowd, as it moves from fear to hope and back again. Conversely, thinly traded markets, such as speculative stocks, do not generally show consistent Elliott Wave behavior.

From Theory to Science

Since the 1940s, when Ralph Nelson Elliott established the existence of patterns within the price charts of liquid markets that resulted from mass human psychology, the Elliott Wave Principle has been the subject of constant controversy. It has been said that if you were to place 10 Elliott Wave technicians in a room to discuss the forecast on a single market, you would get at least 12 opinions - and possibly a considerable amount of bloodletting! If the best Elliott experts can't agree, what chance does a trader have of using Elliott Wave Theory as a reliable forecasting tool?

In finding an answer to this question, over a decade of research has been conducted on the subject. It required hundreds of thousands of hours of computer programming, and the analysis of millions of charts. It required the formation of a dedicated research team to collate a database of millions of Elliott Wave patterns and market forecasts. It even required the help of many thousands of traders, and several industry veterans, gifting their unused computer time to this extensive project so that software could compare millions of these forecasts with subsequent real market action - and determine their accuracy.

The results of this research into the Elliott Wave Principle have been astounding: Statistical analysis has demonstrated that many Elliott wave patterns are quite different in shape and frequency than previously thought. Understanding of the Elliott Wave Principle previously was the result of personal observation, and herein lies the fundamental problem: Human nature will see what it expects to see. Elliott experts often clash because their opinions differ as to the relative frequency and the most common shapes of the various Elliott patterns. These varying opinions result in different labeling of the same chart, leading to different market outlooks.

After careful consideration, it was established that the most reliable way to solve this problem was to analyze statistically a large number of current charts, find all the valid Elliott wave patterns and document every one. The research and statistical analysis revealed the truth about common patterns shapes, their relative frequency and even the reliability of each market forecast being correct. By identifying the beginning of a pattern, a trader can calculate where and when it is most likely to complete, providing a significant forecasting advantage when trading liquid markets.

It is important to note that this research has been conducted within the basic tenets of the Elliott Wave Principle. The conclusions have led to a redefinition of the most common shapes of Elliott Patterns. The Wave Principle has not been changed, but instead has been made statistically testable, objective and therefore, much more accurate. In time, the contention is that traders will rediscover the Elliott Wave Principle and view it in an entirely new light. As further research is published, it will be possible to define every facet of the Elliott Wave Principle - based on verifiable statistical data and analysis. No more opinions. No more conjectures. No more arguments. Just facts. Due to the development of a scientific method of determining every facet of the Elliott Wave Principle, and an Elliott Wave database that grows daily, our understanding of the Elliott Wave Principle is becoming more accurate. The reason for this is that we are able to access more and more statistics based on real market patterns.

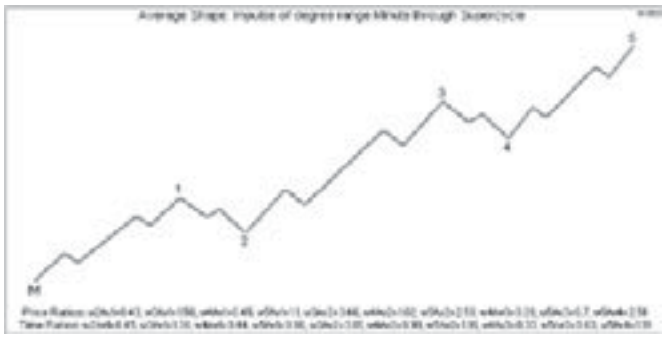
Summary of All Elliott Wave Patterns

What follows is a summary of all Elliott Wave Patterns, including their most common shapes when found in stock markets over varying lengths of time:

Impulse Waves

Impulses are the fundamental Elliott wave pattern. An impulse is characterized by five waves, three of them moving in the direction of the larger trend and two retracements, (or corrections) moving against the larger trend. Each wave is labeled at its end and numbered 1 through 5. A rising impulse will always start at, or just after, a major low. Note that all Elliott wave patterns may be inverted. It therefore follows, that in a falling market, an inverted impulse will always start at or just after a major high.

Figure 1: Impulse Wave



The Elliott Wave rules for an impulse wave are:

1. Wave 1 must itself be an Impulse or a Leading Diagonal pattern.
2. Wave 2 can be any corrective Elliott Wave pattern except a Triangle.
3. No part of wave 2 can retrace more than 100% of the height of wave 1.
4. Wave 3 must be an Impulse.
5. Wave 3 must be longer than wave 2 by price.

6. Wave 4 can be any corrective Elliott Wave pattern.
7. Waves 2 and 4 cannot overlap (share common price area).
8. Wave 5 must be an Impulse or an ending Diagonal.
9. Wave 5 must be at least 70% of the length of wave 4 by price.
10. Wave 3 can't be the shortest by price versus waves 1 and 5.

The most common shape of an impulse wave varies considerably, depending on the time frame and the direction of the pattern (rising or falling). In addition to being inverted, the shape of the rising impulse is quite different from the falling impulse. A rising impulse has two strong moves, waves 3 and 5. Wave 5 is generally steeper than wave 3. In comparison, the strongest move for a falling impulse is wave 3. Waves 1 and 5 move a similar price distance. These variances are the result of an entirely different trading psychology of the trading public, which makes sense, considering that one market is rising and the other market is falling. Note that in both rising and falling markets, waves 2 and 4 are very similar in price and time and wave 1 is generally a short, sharp move with the larger trend. When a trader has identified the first four waves of an impulse in a rising market, they can expect wave 5 to be a strong move up, similar to wave 3. However, in a falling market, the trader would expect wave 5 to move down a similar price distance to wave 1.

The shapes of the Elliott patterns also depend on the time frame. The graphs below show Elliott patterns found in daily data spanning weeks to months.

Figure 2: Impulse wave

Figure 3: Inverted impulse wave

The shapes of these impulses are quite different when spanning a longer time frame such as months to years, as can be seen from Figure 4. Wave 1 is much longer in a rising market than in a falling market.

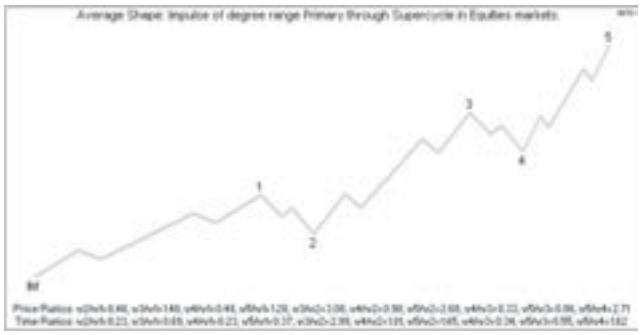


Figure 4: Long-term impulse wave

Diagonals

Other than an impulse, the only other Elliott wave pattern that moves with the larger trend is known as a "diagonal." There are two types of diagonals, known as "leading diagonals" and "ending diagonals." Figures 5, 6 and 7 illustrate the most common shapes for diagonals. Although the most common shapes of these two variations of diagonals are nearly identical, they have quite different internal structures. Research has identified many thousands of rising diagonals but not one instance of a falling leading diagonal.

Leading Diagonal Pattern

Internal Structure of a Leading Diagonal:

1. Wave 1 is an Impulse or a Leading Diagonal.
2. Wave 2 may be any corrective pattern except a Triangle.
3. Wave 3 is an Impulse.
4. Wave 4 may be any corrective pattern.
5. Wave 5 is either an Impulse or an Ending Diagonal.

Figure 5: Leading Diagonal

Note: We have never observed an Inverted Leading Diagonal pattern in Futures or Commodities markets.

Ending Diagonal Pattern

Internal Structure of an Ending Diagonal:

1. Waves 1, 3 and 5 of an Ending Diagonal may be any of the following: a Zigzag, Double or Triple Zigzag pattern.
2. Wave 2 may be any corrective pattern except a Triangle.
3. Wave 4 may be any corrective pattern.

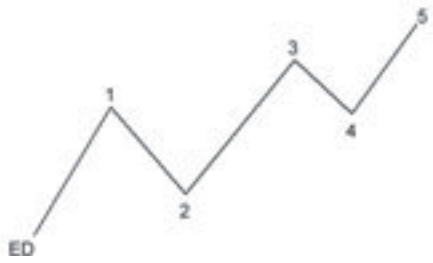


Figure 6: Ending Diagonal

Figure 7: Inverted Ending Diagonal

Moving Against the Larger Pattern – Corrective Waves

Statistical analysis of millions of charts has demonstrated that many Elliott Wave patterns are quite different in shape and frequency than previously thought. A trader can utilize the refined Elliott Wave principle to more reliably forecast any liquid market - thereby increasing trading profits. It is easier to predict market direction more accurately when the most common shapes of Elliott Wave patterns are known. By identifying the beginning of a pattern, a trader can calculate where and when it is most likely to complete.

The Elliott Wave Principle show that the markets move in five wave patterns with the larger trend, then pull back in three or five wave corrections, before continuing with the larger trend. The market moves up in fives waves, then pulls back, before continuing with the larger trend.

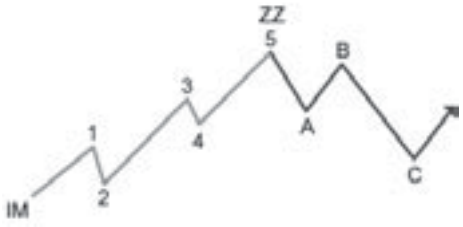


Figure 8: Elliott Wave

Patterns moving with the larger trend are always five wave patterns, and are labeled with the numbers, 1-2-3-4-5. Patterns moving against the larger trend can either be three or five wave patterns, and are labeled with letters A-B-C, or A-B-C-D-E. The most common Elliott Wave patterns that move against the larger trend are known as corrective patterns.

Zigzags

Rules for Zigzags:

1. Wave A must be an Impulse or a Leading Diagonal pattern.
2. Wave B can only be a corrective pattern.
3. Wave B must be shorter than wave A by price distance.
4. Wave C must be an Impulse or an Ending Diagonal.
5. Wave C may not be an Ending Diagonal if wave A is a Leading Diagonal

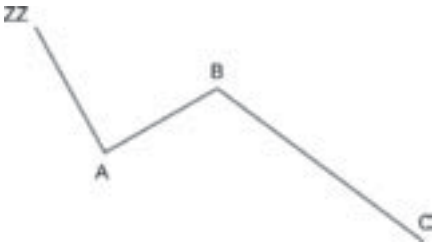


Figure 9: The most common shape for a Zigzag pullback in a rising market spanning days to weeks.

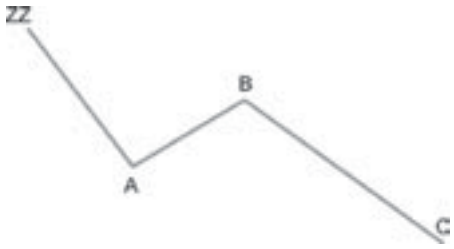


Figure 10: The most common shape for a Zigzag pullback in a rising market spanning weeks to months.

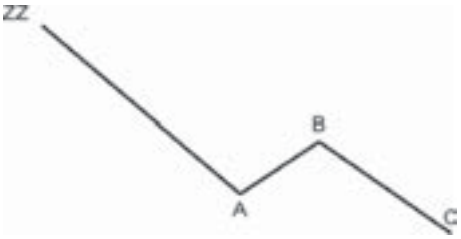


Figure 11: The most common shape for a Zigzag pullback in a rising market spanning months to years.

Figure 12: The most common shape for a Zigzag rally in a falling market spanning days to weeks.

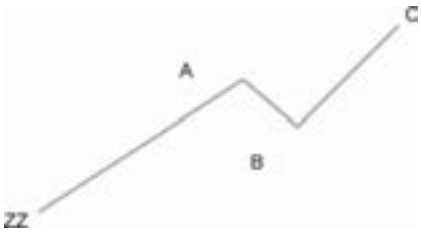


Figure 13: The most common shape for a Zigzag rally in a falling market spanning weeks to months.

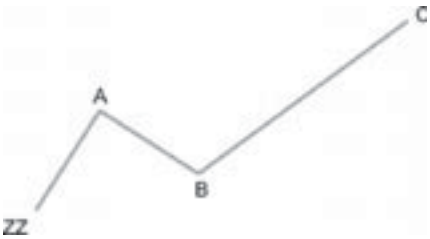


Figure 14: The most common shape for a Zigzag rally in a falling market spanning months to years.

Note how the average shape varies for different time frames. Zigzag patterns spanning days to weeks generally have much longer wave C's than those patterns spanning months to years.

Double and Triple Zigzags

A common variation of the Zigzag pattern is the Double Zigzag and the Triple Zigzag - these are also known as Double and Triple Sharps. Double Zigzags are very common, while Triple Zigzags are rare.

Rules for Double and Triple Zigzags:

1. Wave W must be a Zigzag.
2. Wave X can be any correction except an Expanding Triangle.
3. Wave X must be smaller than wave W by price.
4. Wave Y must be a Zigzag.
5. Wave Y must be equal to or longer than Wave X by price.
6. Wave XX can be any correction except an Expanding Triangle.
7. Wave XX must be smaller than wave Y by price.
8. Wave Z must be a Zigzag.
9. Wave Z must be equal to or larger than Wave XX by price.

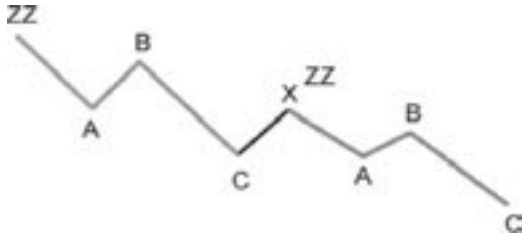


Figure 15: Double Zigzag pattern

The Double Zigzag is made up of two Zigzag patterns connected by a relatively short corrective pattern called an 'x' wave.

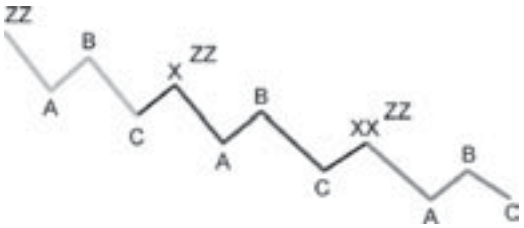


Figure 16: Triple Zigzag

The Triple Zigzag consists of three Zigzag patterns connected by relatively short corrective patterns, known as the 'x' wave and the 'xx' wave. In the examples below, the Zigzag patterns within the Double and Triple Zigzags are represented as straight lines. The first Zigzag is labeled Wave W, and the second Zigzag is labeled Wave Y. In the case of Triple Zigzags, the third Zigzag is labeled Wave Z. Average shapes of Double and Triple Zigzags do not vary much with different time frames i.e. the average shape will be similar irrespective of whether the pattern spans days or years.

Figure 17: The most common shape for a Double Zigzag pullback in a rising market.

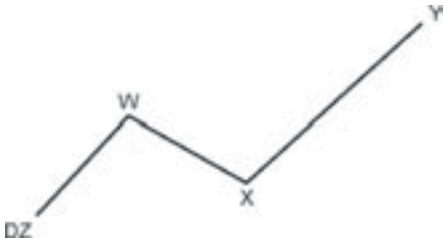


Figure 18: The most common shape for a Double Zigzag rally in a falling market.

Figure 19: The most common shape for a Triple Zigzag pullback in a rising market.

Figure 20: The most common shape for a Triple Zigzag rally in a falling market.

Flats

Flats are another regularly occurring family of corrective patterns. They display similar characteristics to Zigzags (or Sharps) except that they tend to move sideways rather than strongly up or down, hence the name "Flat." On the other side of the coin, Zigzags (as they are also known) move "sharply" or strongly up or down. The most common shapes of Flats are as follows:

The rules for Flats are as follows:

1. Wave A can be any corrective pattern.
2. Wave B can be any corrective pattern except a Triangle.
3. Wave B must retrace wave A by at least 50% (by price).
4. Wave B must be less than twice the price length of wave A.
5. Wave C can only be an Impulse or an Ending Diagonal.
6. Wave C must share some common price territory with Wave A.

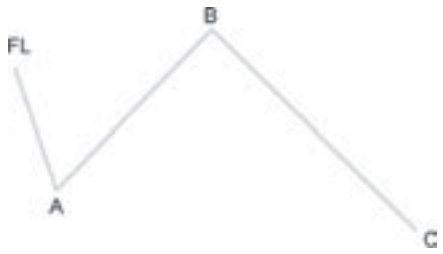


Figure 21: The most common shape for a Flat pullback in a rising market spanning days to weeks.

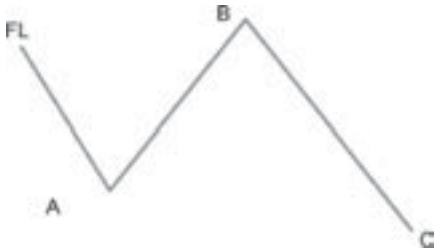


Figure 22: The most common shape for a Flat pullback in a rising market spanning weeks to months.

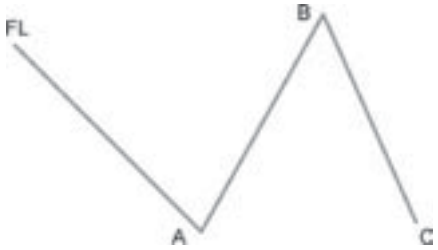


Figure 23: The most common shape for a Flat pullback in a rising market spanning months to years.

Figure 24: The most common shape for a Flat rally in a falling market spanning days to weeks.

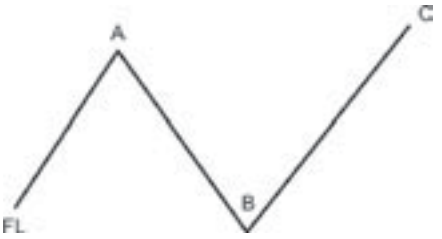


Figure 25: The most common shape for a Flat rally in a falling market spanning weeks to months.

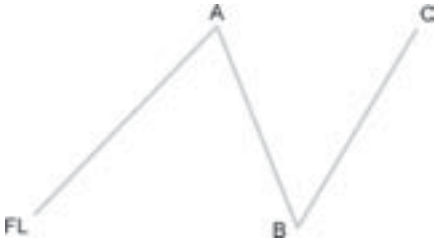


Figure 26: The most common shape for a Flat rally in a falling market spanning months to years.

Double and Triple Sideways Patterns

As Zigzags have variations known as Double and Triple Zigzags (also known as Double and Triple Sharps), it follows that Flats have similar variations, and these are known as Double and Triple Sideways patterns (also known as Double and Triple 3's). Double Sideways patterns appear frequently, while Triple Sideways patterns are rarely seen. A Double Sideways pattern consists of two Flats connected by a corrective pattern. A Triple Sideways pattern is made up of three Flats connected by corrective patterns. Like Double and Triple Zigzags, the time frame does not significantly alter the average shape of Double and Triple Sideways patterns.

Rules for Double and Triple Sideways Patterns:

1. Wave W may be any corrective pattern except a Triangle, or a Double or Triple pattern.
2. Wave X may be any corrective pattern except a Triangle, or a Double or Triple pattern.
3. Minimum Wave X retracement is 50% of Wave W.
4. Wave Y may be any corrective pattern except or a Double or Triple pattern.
5. Wave Y must be greater than Wave X by price except if it is a Triangle.
6. Wave XX may be any corrective pattern except a Triangle, or a Double or Triple pattern.
7. Minimum XX wave retracement is 50% of Y.
8. Wave Z may be any corrective pattern except a Double or Triple pattern. However Z cannot be a Zigzag if Y is a Zigzag.
9. Wave Z must be greater than Wave XX by price.

In the following examples, each Flat is shown as a straight line.

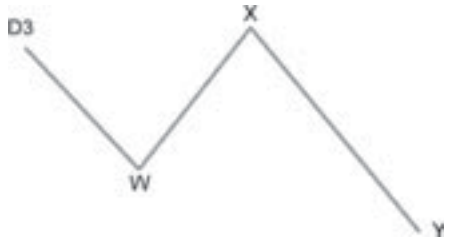


Figure 27: The most common shape for a Double Sideways pullback in a rising market.

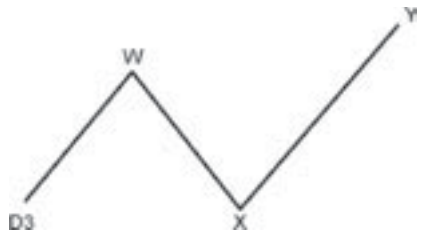


Figure 28: The most common shape for a Double Sideways rally in a falling market.

Figure 29: The most common shape for a Triple Sideways pullback in a rising market.

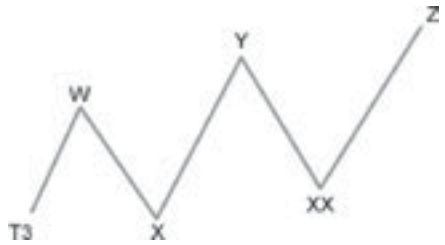


Figure 30: The most common shape for a Triple Sideways rally in a falling market.

Triangles

Only one family of Elliott Wave Patterns remains to be discussed - Triangles. The Wave Principle recognizes two fundamental Triangles known as Contracting Triangles and Expanding Triangles. Triangles are five wave structures labeled A-B-C-D-E that move within two converging or diverging channel lines drawn from the ends of waves A and C, and the ends of waves B and D.

Contracting Triangles

The rules for Contracting Triangles are as follows:

1. Wave A can only be a Zigzag, Double or Triple Zigzag, or a Flat pattern.
2. Wave B can only be a Zigzag, Double or Triple Zigzag pattern.
3. Wave C and D can be any corrective pattern except a Triangle.
4. Waves A, B, C and D must move within or close to within the A-C & B-D channel lines.
5. The intersection of the channel lines must occur beyond the end of wave E.

6. The channel lines must converge. They cannot be parallel.
7. One of the channel lines may be horizontal.
8. Wave E can be a Zigzag, Double or Triple Zigzag, or a Contracting Triangle.
9. Wave E must be less than wave D by price, and wave E must be more than 20% of wave D by price.
10. Either wave A or wave B must be the longest wave by price.
11. Wave E must end in the price territory of A.
12. Wave E must move within or close to within the B-D channel line.

Contracting Triangles are much more common than Expanding Triangles. The most common shapes for contracting triangle pullbacks in a rising market can be seen below.

Figure 31: Overlay of three Contracting Triangle pullback patterns in a rising market.

On closer examination it can be seen that the longer the time-frame of a Contracting Triangle, the shorter waves D and E are in comparison to waves A, B and C, both in price and time. When you see the first three waves develop on a chart, you can then predict the final two moves of the pattern by determining the time span of the chart, and then applying these template pattern shapes.

Figure 32: Overlay of three Contracting Triangle advance patterns in a falling market.

Once again, for inverted Contracting Triangles, the longer the time-frame, the shorter waves D and E are in comparison to waves A, B and C, both in price and time.

Expanding Triangles

The Rules for an Expanding Triangles are:

1. All five waves must be Zigzag, Double or Triple Zigzag patterns.
2. Wave B must be shorter than wave C by price but more than 40% of wave C by price.
3. Waves A, B, C and D must move within or close to within the A-C & B-D channel lines.
4. Wave C must be shorter than wave D by price but more than 40% of wave D by price.
5. Wave A must move within or close to within the A-C channel line.
6. The intersection of the channel lines must occur before the beginning of wave A.
7. The channel lines must diverge. They cannot be parallel.
8. Neither channel line may be horizontal.
9. Wave E must be longer than D but less than 40% of wave E by price.
10. Either A or B will be the shortest wave by price.
11. Wave E must end in the price territory of A.
12. Wave E must move within or close to within the B-D channel line.

Figure 33: Overlay of three Expanding Triangle pullback patterns in a rising market.

As with Contracting Triangles, it is important to note that longer-term Expanding Triangle patterns complete more quickly, relatively, than short-term patterns - when the relative length of the waves are compared.

Figure 34: Overlay of three Expanding Triangle advance patterns in a falling market.

Note: In figures 31, 32, 33 and 34 the thin line represents short-term (days to weeks), the medium thickness line represents medium-term (weeks to months), and the thick line represents long-term (months to years).

Using this Information to Predict Market Direction

Forecasting the market is a simple matter of identifying the first wave or two of a pattern, then establishing where the pattern is most likely to complete. If the market is moving against the larger trend, it will be in a corrective pattern - most likely a Zigzag, Flat, Double Zigzag or Double Sideways. By counting the sub-waves within waves A and B, you can easily determine if it is a Zigzag or Flat. Examine the Rules for Zigzags and Flats and you will see that Wave A of a Zigzag is made up of five sub-waves while Wave A for a Flat is made up of three sub-waves. This is one of the most reliable ways to determine which pattern is playing out. Note that wave B of both patterns is made up of three sub-waves.

When the most likely incomplete pattern is determined, it should be matched with the relevant shape above - taking into consideration the approximate time frame. Then one can determine where the market is most likely to be when the pattern completes. The latest research into The Elliott Wave Principle is redefining it as a statistically sound market-forecasting tool. If you know the most common shapes of Elliott wave patterns and can identify the beginning of a pattern, you can calculate where and when it is most likely to complete.

Calculating the Accuracy of a Market Forecast

As a final verification of the value of our research, several million forecasts were made on real data, and then checked to see what the market subsequently did - and whether the projected target area proved to be correct. The same analysis was then done on data that was generated by random number algorithms. Although a "random walk" chart appears to look like a genuine price chart, it was not created through mass human psychology, as real price charts are. The accuracy of the forecasts based on random walk charts was considered to be the control group.

Figure. 35 Example of Random Walk data

There is always a random probability of a forecast being correct. The result of the random-walk control group specifies this random probability exactly. The difference between the random and real results is the trading advantage. As it happens, the closer the pattern shapes correlated to the Weighted Average Shapes, the higher the probability of the forecast being correct. The following table contains the results of this research. It specifies the probability of a forecast being correct - based on incomplete waves and how close the shapes are to the "perfect" Elliott structure.

Forecasting Accuracy Probabilities Table

Pattern	Wave	Accuracy on Randomly Generated Data	Accuracy on Actual Stock/etc Data
Impulse	2	45%	72.0%
Impulse	3	13%	57.5%
Impulse	5	53%	98.0%
Ending Diagonals	4	80%	91.0%
Ending Diagonals	5	84%	96.0%
Zigzag	2	45%	64.5%
Zigzag	3	45%	59.5%
Double Zigzag	2	65%	88.0%
Double Zigzag	3	24%	43.0%
Flat	2	34%	48.0%
Flat	3	72%	72.0%
Double Sideways	2	53%	64.0%
Double Sideways	3	64%	87.5%
Contracting Triangle	4	64%	76.5%
Contracting Triangle	5	75%	96.5%

The table above shows that the random probability of the forecast being correct for an Impulse Wave 3 as 13%. The probability of the forecast being correct ranges from 40% to 75% - depending on how closely Waves 1 and 2 show "normal" Elliott behavior. Note that the values of a Flat Wave 3 are no better than random. This is the only wave of a common Elliott pattern that cannot be used to forecast accurately. The value of 72% is quite high - simply because the target area is relatively large in comparison to the pattern size. While the most common Elliott Wave patterns (IM, ZZ, DZ, FL, D3) give excellent results, it is Ending Diagonals and Contracting Triangles that give outstandingly accurate forecasts - with probabilities in the high nineties! You can't get much better than that!

Summary

Once you have mastered this powerful technology, you will have an outstanding advantage in forecasting the direction of the market more accurately than ever before.

Biography

Rich Swannell has impacted the understanding and application of the Elliott Wave Principle throughout the world. He authored the market forecasting package – the Elliott Wave Analyzer – which uses his computerized pattern recognition technology to better forecast the markets. His ebook, Elite Trader's Secrets, details his ongoing research, his findings, and how to use this information to forecast markets more accurately. Many experts regard it as the most significant development in Elliott Wave pattern recognition since R. N. Elliott first published his findings seventy years ago.

Rich lives in Perth, situated on the sunny west coast of Australia – one of the most isolated capital cities in the world.

A New Perspective on the Quantitative Self-Affinity of Elliott Waves

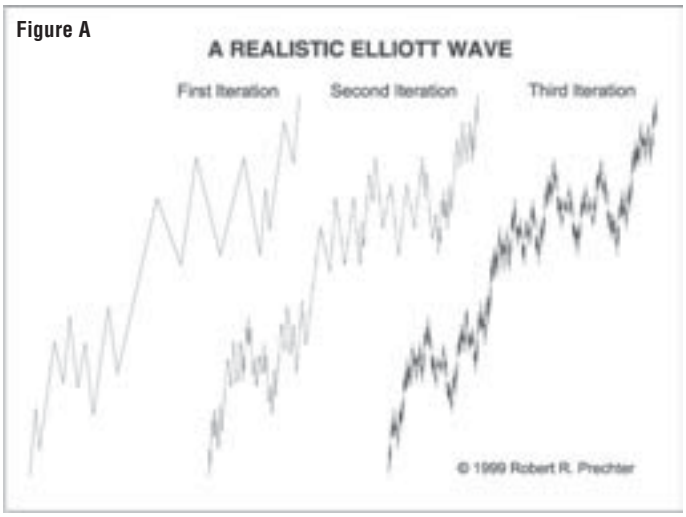
4

Robert R. Prechter Jr., CMT

Introduction: The Elliott Wave Fractal

A fractal is a self-similar or self-affine object. It looks like itself – to one degree or another – regardless of the scale at which you observe it. In the 1930s, Ralph Nelson Elliott discovered that the record of stock prices is a fractal. More important, he demonstrated that it is a specific fractal with a definite form, though it varies quantitatively. Figure A shows several iterations of one idealized Elliott wave.

Figure A



Records of financial market prices appear to be a special type of fractal that is typically found in the context of life forms, which it variously permeates (as in bronchial, cardiovascular and nervous systems) or regulates (as in growth patterns). I call it "robust"[1] to designate a fractal that has both a *fixed quality of form*, like self-identical fractals such as nesting squares, as well as a *variable quantitative aspect*, like indefinite fractals such as clouds and seacoasts.

The Fibonacci Sequence and the Wave Principle

The Fibonacci sequence is 1, 1, 2, 3, 5, 8, 13, 21, 34, 55, and so on. It begins with the number 1, and each new term from there is the sum of the previous two. The limit ratio between successive adjacent terms is .618034..., an irrational number variously called the "golden mean" and "divine proportion," but in this century more succinctly "phi" (Φ). The Fibonacci sequence and the Fibonacci ratio appear ubiquitously in natural forms ranging from the geometry of the DNA molecule to the physiology of plants and animals. A "golden section" is a line split into Fibonacci proportion, as shown in Figure B. Several golden sections appear in this paper.

Figure B

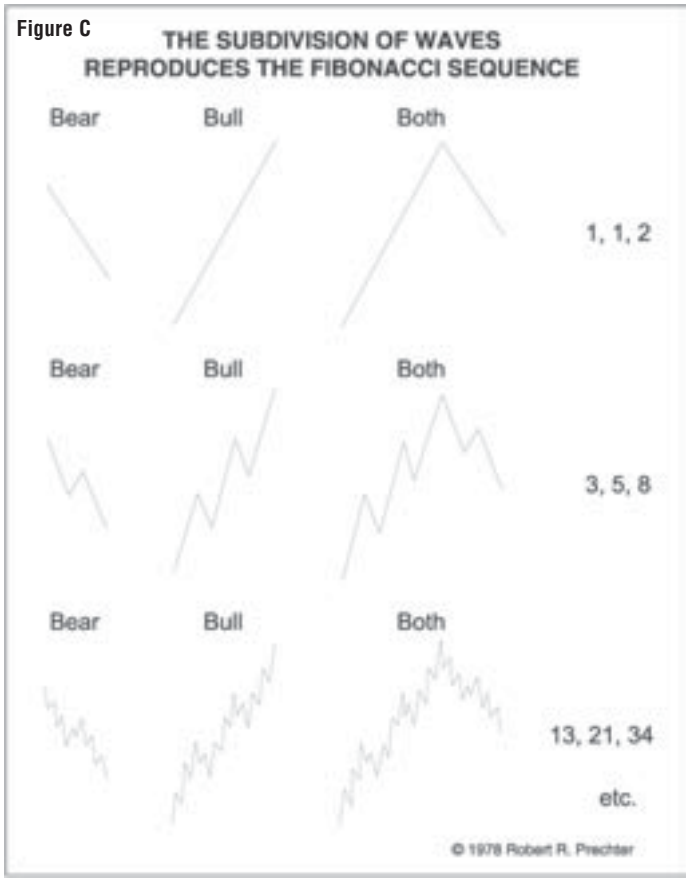
Elliott's publisher, renowned investment advisor Charles Collins, observed that the Wave Principle model contains the Fibonacci sequence.[2] After researching the subject to the small extent, possible at the time, Elliott presented the final unifying conclusion of his theory in 1940,[3] explaining that the progress of waves has the same mathematical base as so many phenomena of life.

As Collins noted, the Fibonacci sequence governs the numbers of waves that form the movement of aggregate stock prices in an expansion upon the underlying 5-3 relationship. Figure C shows the progression. The simplest expression of a corrective (counter-trending) wave is a straight-line decline. The simplest expression of a motive (trending) wave is a straight-line advance. A complete cycle is two lines. At the next degree of complexity, the corresponding numbers are 3, 5 and 8. This sequence continues to infinity.

Notation and Nomenclature

Waves are categorized by degree. The degree of a wave is determined by its size and position relative to component, adjacent and encompassing waves. Elliott named nine degrees of waves, from the smallest discernible on a graph of hourly stock prices to the largest he could assume existed from the data then available. This paper labels only three degrees of waves, which in order of increasing size are called Primary, Cycle and Supercycle. Primary waves link together to form Cycle waves, which link together to form Supercycle waves, and so on to Grand Supercycle waves and higher. Though this paper does not label smaller waves, Primary waves in turn subdivide into Intermediate waves, which subdivide into Minor waves, and so on as well. Primary waves are labeled with Arabic numerals in circles, such as ③, Cycle waves are labeled with Roman numerals, such as **III**, and Supercycle waves are labeled with Roman numerals in parentheses, such as (**III**).

Figure C



In this paper, the symbol Φ stands for .618 or its inverse 1.618 or any fraction composed of adjacent Fibonacci numbers. The symbol Φ^2 stands for .382 or its inverse 2.618 or any fraction composed of alternate Fibonacci numbers. For expanded discussions of the details of the Wave Principle and the Fibonacci sequence, please see Chapters 1 through 4 of *Elliott Wave Principle* and Chapters 1 and 3 of *The Wave Principle of Human Social Behavior.*

Part I: Formal Self-Affinity Between Two Fifth-Wave Expressions of the Elliott Wave Fractal

Figure 1-1: An Intriguing Correlation

Figure 1-1 shows two price series. One of them is a multi-year period in the Dow Jones Industrial Average. Before discovering what the other series is, wouldn't you agree that the two series appear closely correlated?

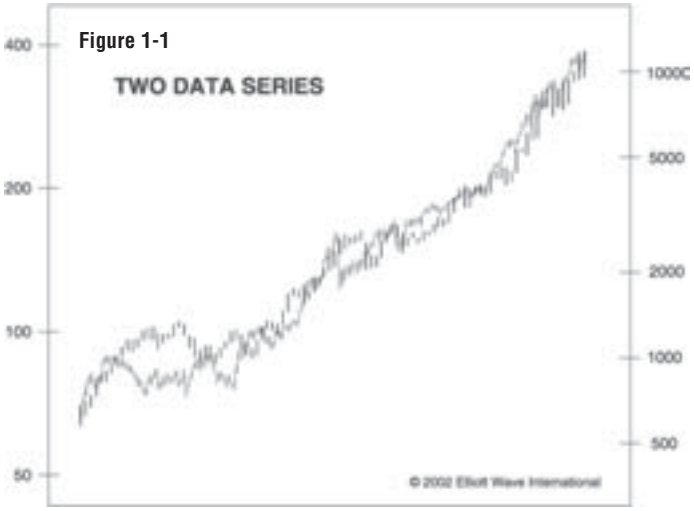
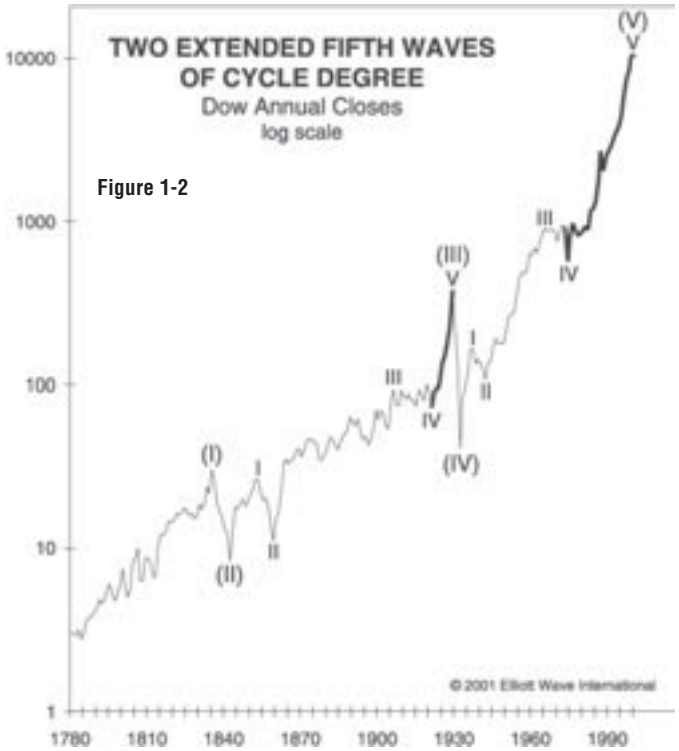


Figure 1-2: Cousins

Figure 1-2 shows the Grand-Supercycle-degree uptrend in the U.S. stock market that began circa 1784. It subdivides into five waves of Supercycle degree, labeled (I), (II), (III), (IV), (V), which in turn subdivide into Cycle degree waves labeled I, II, III, IV, V. This is the template from which we will investigate two waves of the same number (fifth) and degree (Cycle). Only two fifth waves of this degree have a detailed daily and intra-day price record, as recorded by the Dow Jones Industrial Average (DJIA): the 1921-1929 advance, which was wave **V** of (III), and the 1974-2000 advance, which was wave **V** of (V). These waves are highlighted in bold on the graph.



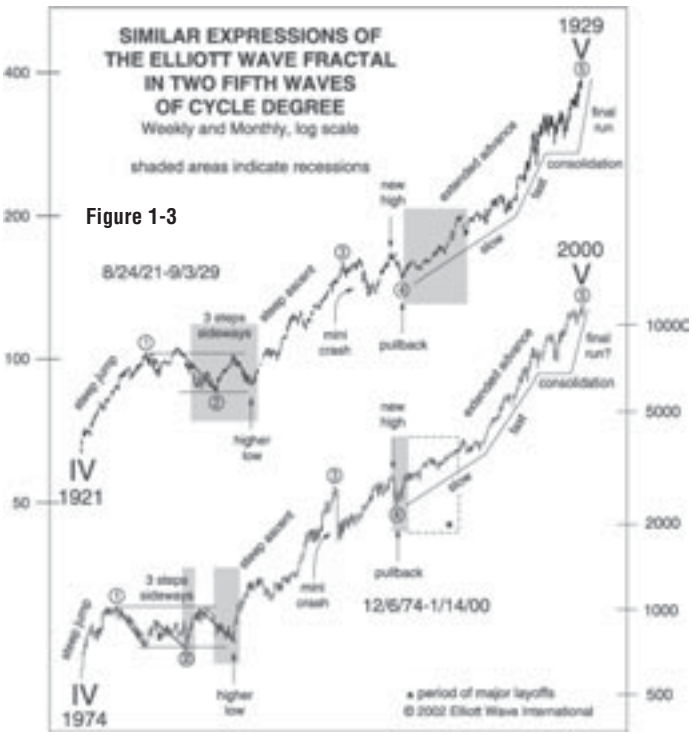
Look back at Figure 1-1 and realize that both plots are of the DJIA. In fact, they are the highlighted portions of Figure 1-2, plotted so that they take up the same space on the page. Although the two waves are quantitatively different in terms of duration (8.1 years and 25.1 years) and extent (596.5% gain vs. 1929.6% gain), their nuances of *form* – representing the progression of mass psychology – are strikingly similar.

Figure 1-3: The Formal Affinity of Two Cycle-Degree Fifth Waves

Figure 1-3 displays the same data, but the 1920s bull market is depicted by the weekly range so that the data frequency of the two plots more closely match. While these two bull markets subdivide into the requisite five Primary waves (marked with numbers in circles), there is much more to their similarity than that. The notes on the graph detail some of the similarities in form between these two Cycle-degree fifth waves, as follows:

- Wave ① is a steep jump.
- Wave ② consists of two downward moves, one long and one short.
- Wave ② is followed by a deep decline that bottoms just slightly above the low of wave ②.
- Wave ② and its test are associated with economic recession(s).
- From that point forward, wave ③ is a steep ascent.
- Wave ④ begins with a crash.
- Wave ④ includes a new all-time high.
- Wave ④ ends above the crash low.
- The end of wave ④ begins an economic recession.
- Wave ⑤ is extended.
- Wave ⑤ starts slowly and then accelerates.
- A consolidation precedes the final high.
- The portion of the wave following the test of the low of wave ② appears upwardly "stretched" compared to most motive waves, with corrections that are exceptionally shallow, including a "running correction" for wave ④.

Even many of the quantitative aspects of these two waves are similar. Several of the waves and turning points share approximately the same length, height and/or width. Overall, the 1974-2000 advance produced **3.2** times the percent-



age gain of the 1921-1929 advance in **3.1** times the time. (1929.6%/596.5% = **3.2**; 25.1 yrs./8.1 yrs. = **3.1**.) In other words, these two bull markets' non-compounded percentage gains over time are essentially identical.

The social results of these psychological progressions are also quite similar. Observe that in each case, the corrections for waves ② and ④ produced recessions. They appeared at nearly the same times as well. If you recall the early 1990s, extensive layoffs and the biggest collapse in S&P earnings since the early 1940s dogged the economy right through 1993, even though the Bureau of Economic Research declared the recession "officially" over in 1991. These two periods shared other social aspects as well, such as a stock mania, a real estate boom, easy credit, a preoccupation with finance, drug prohibition, a relatively peaceful world scene and middle-of-the-road politics. If time were irrelevant to human beings (which, in terms of generating social forms, it may well be), the two data series would be a record of essentially the same experience.

The numerous similarities cited above are not likely coincidence. While a single instance of close similarity between two waves of the same number and degree may not be enough for generalizing, we might at least begin to suspect that fifth Elliott waves of Cycle degree share certain quantitative aspects of form, which in turn have similar results in social action. This particular form may be an expression of how mass psychology progresses in Cycle degree fifth waves that contain extended fifth sub-waves.

These two periods were substantially different in terms of technology, communication, world events and political status. The U.S. was a farming country in the 1920s. It was a financial center in the 1990s. People communicated by telegram and letter in 1929, by email and cell phone in 2000. People read newspapers in the 1920s, and they watched satellite television in the 1990s. The U.S. was emerging from political isolationism in the 1920s, and in the 1990s, it was the only world-class political power. What is undeniably the same in the two periods, though, is the psychological progression within society, which is what Elliott waves in the stock market depict. The general level of technology is irrelevant to those progressions.

1920s Redux

As remarkable as it is that the advance of 1974-2000 mirrored that of 1921-1929 so closely, it is of some scientific import that practitioners of the Wave Principle *predicted* this affinity, anticipating "a period of economic stability and soaring stock prices"[4] because "the 1920s bull market was a fifth wave of a *third* Supercycle wave, while Cycle wave V is the fifth wave of a *fifth* Supercycle wave."[5]

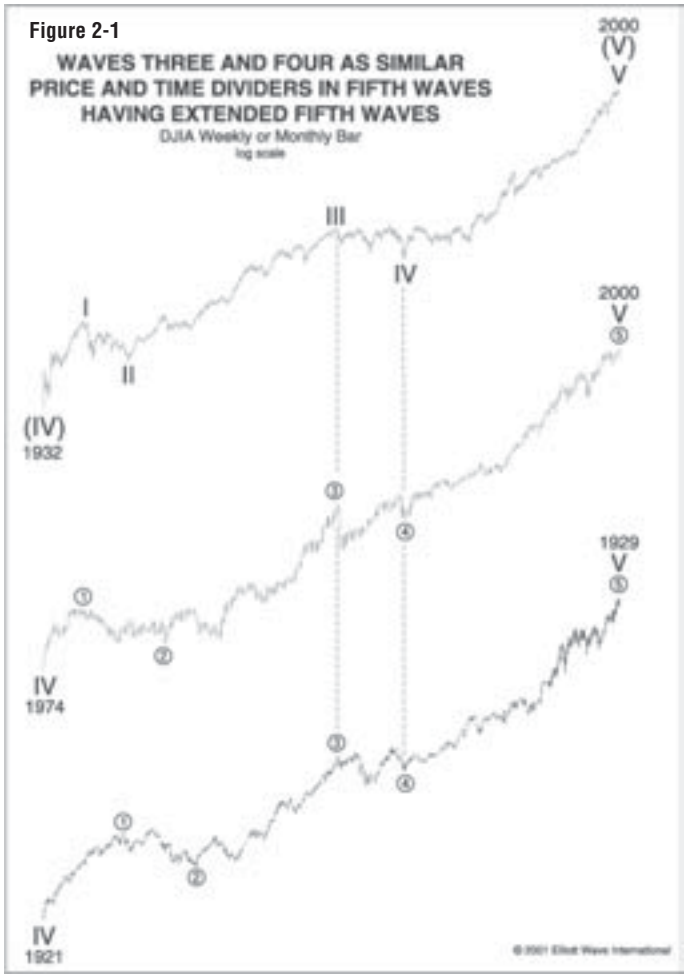
Observe that in order to predict the bull market's affinity to the 1920s, one had to predict a great bull market in the first place. This dual forecast was possible because of the Wave Principle.

Part II: Quantitative Self-Affinity Among Three Fifth-Wave Expressions of the Elliott Wave Fractal

Elliott described primarily the repeating *qualitative* aspects of financial markets' price structure, such as these noted in Figure 1-3. A detailed study of the stock market in light of the Wave Principle and its Fibonacci governor is beginning to suggest that some *quantitative* aspects of waves have some measure of regularity as well.

Figure 2-1: The Similar Positions of Wave Three and Four's Endpoints

To investigate this aspect of Elliott waves, we will begin by including another major fifth wave that sports an extended fifth sub-wave. The addition, plotted at the top of Figure 2-1, is Supercycle wave (V) from 1932 to 2000, plotted to cover the same space on the page as the other two waves. Of course, this wave ended concurrently with its final component of one lesser degree, wave V, shown as the middle graph. To see where these waves fit into the Grand Supercycle advance from 1784, refer to Figure 1-2. Although these three waves are vastly different in terms of percentage gain and duration, they share certain



quantitative aspects. The most striking shared aspect of these waves is the nearly identical placement of waves three and four, as indicated by the dashed lines in Figure 2-1. In all three cases, these waves appear to end at nearly the same price and time with respect to the length of the entire wave. Let's take a closer look.

Figure 2-2: Wave Three as an Equality Time Divider (in Years)

In February 2000, *The Elliott Wave Theorist*[6] noted that the simultaneous end of waves ⑤ and V was timed so that the peaks of waves ③ and III respectively split waves V and (V) into equal Fibonacci numbers of years. Figure 2-2 reveals that the peak of wave ③ in the 1920s occurred at the same relative position.

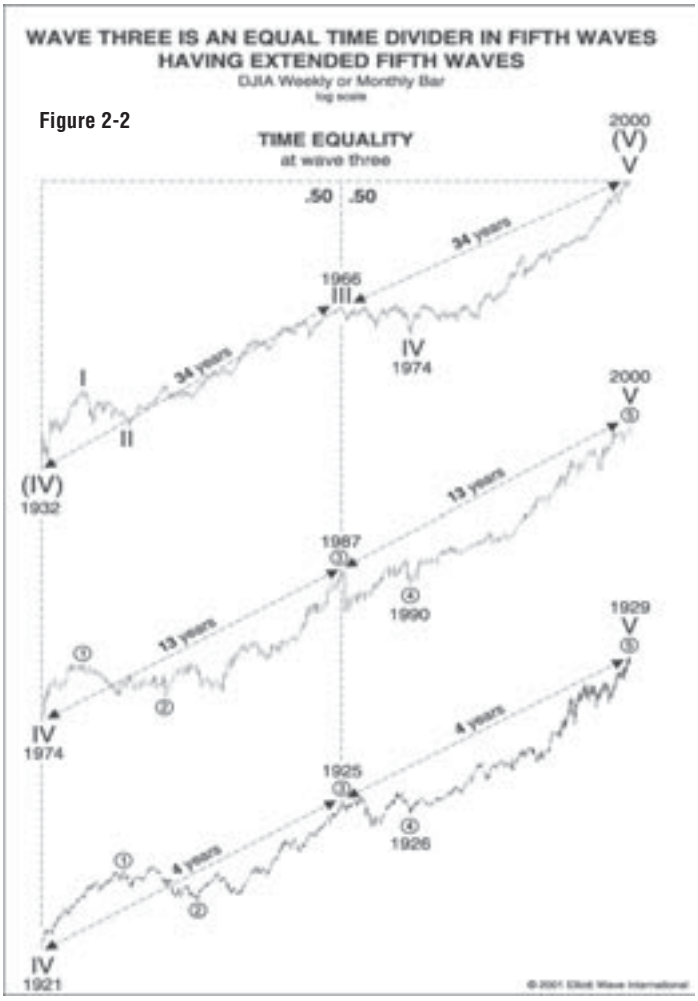


Figure 2-3: Wave Four as a Fibonacci Time Divider (in Years)

As you can see in Figure 2-3, wave four, like wave three, occurs at the same time relative to the length of each whole wave, but this time, the splits create Fibonacci sections. In each case, the duration up to the low of wave four is ϕ times the total duration, the duration of wave five is Φ times the duration up to the low of wave four, and the duration of wave five is Φ^2 times the total duration. Specifically, in the top graph, wave ⑤ covers **3 out of 8** years (**3/8**); in the middle graph, wave ⑤ covers **10 out of 26** years (**5/13**); in the bottom graph, wave V covers **26 out of 68** years (**13/34**), a Φ^2 relationship in each case. The periods preceding the end of wave four cover **5 out of 8** years (**5/8**), **8 out of 13** years (**8/13**) and **21 out of 34** years (**21/34**), respectively, a Φ relationship in each case. The two periods to the right and left of the end of wave four, then, last **3 and 5** years (**3/5**) in the top graph, **10 and 16** years (**5/8**) in the middle graph, and **13 and 21** years (**13/21**) in the bottom graph, also a Φ relationship in each case.

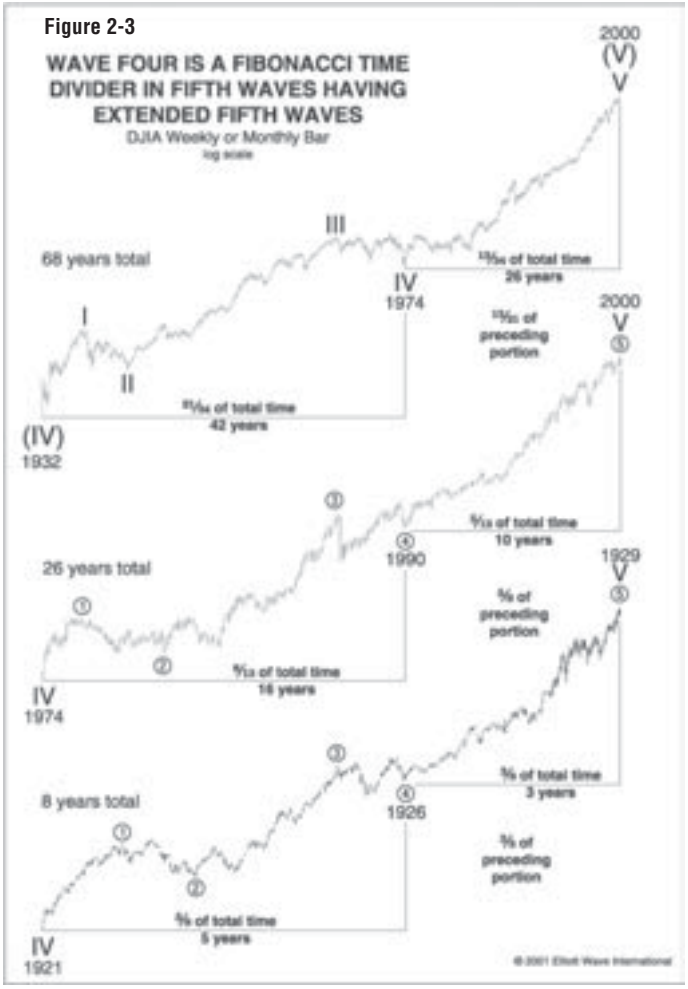


Figure 2-4: Wave Three as a Price Marker

Wave three appears to serve not only as a time marker but also as a price marker. On logarithmic scale, the price distance from the starting point of each wave to the peak at the end of wave three is nearly the same in all three cases. Here are the measurements:

Top: Wave III ends at 2.998 in a log range of 1.615-4.069, at the **.563** division point.

Middle: Wave ③ ends at 3.435 in a log range of 2.762-4.069, at the **.515** division point.

Bottom: Wave ③ ends at 2.202 in a log range of 1.806-2.581, at the **.511** division point.

The end of each wave three, then, is a marker dividing the entire impulse wave into two sections at roughly the same point in terms of price logs, as you can see in Figure 2-4. Observe that in the two waves of the same degree, Cycle wave V (middle and bottom chart), the division is virtually identical at **.513** ± .002.

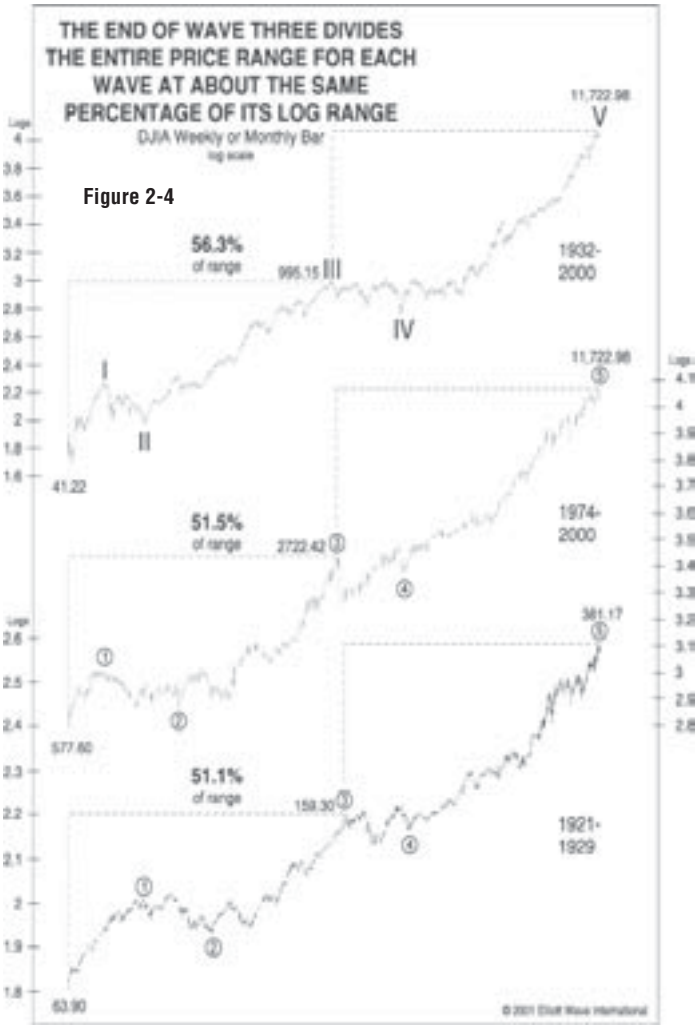


Figure 2-5: Wave Four as a Price Marker

Wave four is also more than just a time marker; it is a price marker as well. On log scale, the price distance from the starting point of each wave up to the low at the end of wave four is virtually the same in all three cases. Here are the measurements:

Top: Wave IV ends at 2.762 in a log range of 1.615-4.069, it at the **.4672** division point.

Middle: Wave ④ ends at 3.374 in a log range of 2.762-4.069, at the **.4683** division point.

Bottom: Wave ④ ends at 2.163 in a log range of 1.806-2.581, at the **.4614** division point.

It follows, then, that the price distance of wave five is also virtually the same in all three cases. This means that the end of each wave four divides each entire impulse wave into two sections of the same relative height, expressed in logs of price. As you can see in Figure 2-5, that point is at **46.5%**, ± 0.4. The division points at waves IV in 1974 and ④ in 1990 (see top two charts) are very close to each other, at .4672 and .4683, respectively. They would have been identical (at .4660) had the Dow peaked 1.5 percent higher, at 11,895.

As shown in Figures 2-4 and 2-5, neither the start nor the end of wave four marks precisely the 50 percent division point in terms of logs of price. It is the case, though, that the 50 percent division point comes *within* wave four every time. We may have a new guideline for wave development, then, which is that in terms of price logs, wave four straddles the halfway point of an entire fifth wave in which the fifth wave is extended.

A Hint of More Precise Self-Affinity Between Waves V and (V) in Both Price and Time

When calculating the time ratios in terms of days, we find that wave three still splits the total duration of each wave roughly into a .50 ratio. The division points, beginning with the top chart in Figure 2-2, are 49.75%, 50.65% and 52.35%, respectively, of the total durations. With respect to Figure 2-3, the lows of wave four divide the total durations in days at the 62.82%, 63.12% and 64.19% points, respectively, creating very nearly a Fibonacci section at **.628-.642** of the whole, which is .635 ± .007.

Self-affinity typically refers not to various expressions of a type of fractal object but to the similarity of the *same* object at *different component degrees*. Most impressive is the price and time position of the end of wave four within Supercycle (V) and its component, Cycle wave V.

- In terms of price, wave four subdivides these waves at the **.467** and **.468** points respectively, which are nearly identical.
- In terms of time, wave four subdivides these waves at the **.628** and **.631** points respectively, which are identical to two decimal places, at **.63**.

Parts III and IV will focus more closely upon Fibonacci relationships between these two waves, (V) and V, the latter of which is a component of the former.

Part III: Price Relationships within Waves (V) and V

A Reliable Price Relationship

The fact that Cycle wave V is a fifth wave is important because there are several guidelines of wave development that indicate what the extent of a fifth wave is likely to be. In the 1940s, R.N. Elliott noted two cases in which an extended fifth wave had a Fibonacci relationship to the entire distance covered by the first through third waves. On arithmetic scale, this relationship held true for the 1930s bull market and for the 1920s bull market up to the 1928 peak, as you can see by the circled notes in Figure 3-1, from his 1946 book.[7] With subsequent research, I proposed the generalization that wave 5's length is sometimes related by the Fibonacci ratio to the net travel of waves 1 through 3. Figure 3-2, from *Elliott Wave Principle,*[8] shows an idealized wave in which wave ⑤ satisfies the guideline in being related by .618 to waves ①-③.

Wave Multiples Are Often Close to Fibonacci Fractions

The relationships that the market forms are usually off slightly from the phi limit ratio (.618) between percentages or multiples. Some of nature's forms, such as spiraling seashells, can reflect the irrational number phi, but others, such as flower, seed and stem arrangements in plants, use whole numbers to generate Fibonacci ratios, which deviate from .618. The mass psychology behind the stock market, for whatever reason, similarly adheres to Fibonacci number fractions. The decimal expressions for adjacent and alternate Fibonacci number *fractions* are as follows:

Fraction	Decimal	Fraction	Decimal
2/3	.667	1/3	.333
3/5	.600	2/5	.400
5/8	.625	3/8	.375
8/13	.615	5/13	.385
13/21	.619	8/21	.381
21/34	.618	13/34	.382

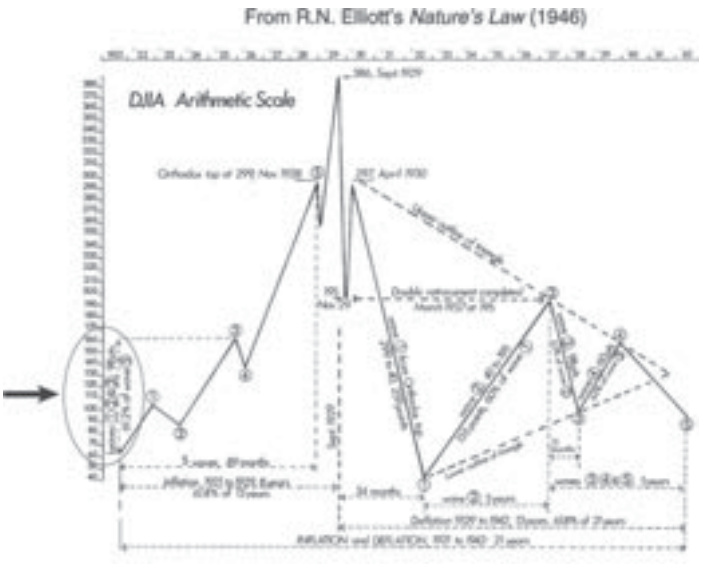
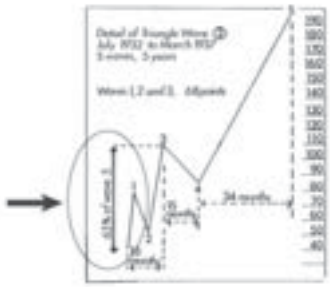


Figure 3-1



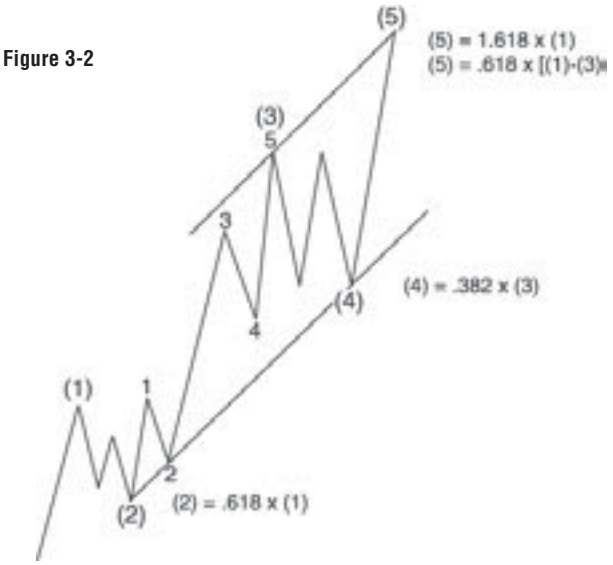


Figure 3-2

Price Multiples

Comparing major waves' components in arithmetic terms (the number of "points") is often meaningless; they must be stated as multiples or percentages in order to express their relative achievements. A doubling of prices can be called a multiple of 2 or as having an end value equal to 200 percent of its starting value. We can also express the extent as a gain of 100 percent. *Multiples* are nearly the same as percentage gains for substantial moves. A 900 percent gain, for example, is a multiple of 10; a 1900 percent gain is a muliple of 20, and so on. The difference is always 100 percent, or a multiple of 1. As it turns out, the ratios between measurements for movements in the Supercycle are perfect or nearly so when relating them in terms of their multiples. For the rest of this paper, the diagrams and calculations involving price refer to wave extents as multiples of their starting points. (In the illustrations, "m" stands for "multiple.") In the depictions in this report, the short-cut symbol Φ stands for any value that attains or approximates a ratio between adjacent Fibonacci numbers.

Keep in mind that 2/3 and 3/2 express the same relationship between two numbers, as do 3/5 and 5/3, 5/8 and 8/5, and so on. Likewise, when you see decimals above 1.00, they are simply inverses of lesser ratios; for example, 1.67 is the inverse of .60, and 1.60 is the inverse of .625.

Various Interpretations within Wave V

Contrary to the norm, several waves in these studies have multiple turning points. Wave V has two starting points: 1974 and 1982, each of which was recognized as such at the time.[9] Wave ⑤ ended on two dates as well, on January 14, 2000 in the Dow and on March 24, 2000 in the S&P. Evidence from price and time relationships indicates that the stock market regards all of these turning points as important. For these studies, the end of wave ③ is marked at an "orthodox" (end of wave pattern) top on April 6, 1987 and the end of wave ④ is marked on October 11, 1990 rather than at their price extremes. This date fits an acceptable wave pattern in the Dow and coincides with when the Value Line Index and the Dow Jones Transports approached and exceeded, respectively, their lows of 1987.4

Figure 3-3: A Fibonacci Relationship in the Supercycle

In Supercycle wave (V), waves I-III took place from 1932 to 1966. The rise in terms of daily closing price extremes created a multiple of just over 24 times. Wave V from 1982 to 2000 created a multiple of just over 15 times. Note that this relationship is 8 to 5. In other words, wave V produced **5/8** of the multiple of waves I-III, as illustrated in Figure 3-3.

This relationship is exact. If we take the multiple of waves I though III out to four (or more) decimal places at 24.1424, and multiply it by 5/8, or .625, and project an upside target from its starting point at 776.92, we get **11,722.95**. The

all-time closing high on January 14, 2000 was **11,722.98**. This is a remarkably close relationship for a wave that lasted most of the 20th century. We can further appreciate how close these numbers are by understanding that the smallest possible incremental DJIA change that a single stock within the average could produce at the time was 0.31 Dow point, which is ten times the difference between the two numbers. It took an intricate cooperation among Dow issues to achieve a reading that was essentially a perfect Fibonacci number fraction. Thus, wave V from 1982 has satisfied Elliott's targeting observation of sixty years ago by fulfilling a precise Fibonacci relationship to the net rise of the preceding two impulse waves. In fact, it reflects the *specific* Fibonacci relationship embodied in the idealized illustration added to *Elliott Wave Principle* a number of years ago, as reproduced in Figure 3-2, which is marked,"⑤ =.618 ①-③."

Figure 3-3

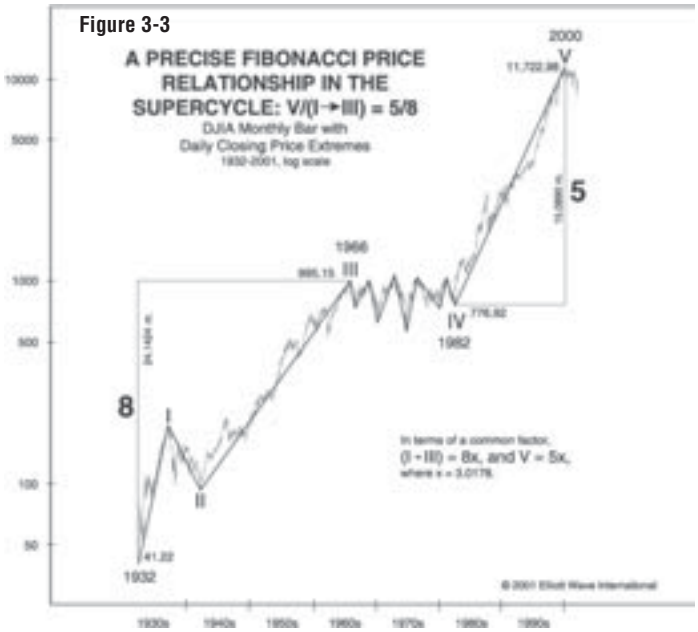


Figure 3-4: The Inverse Relationship in Cycle Wave V

When labeling the end of wave IV in 1982, as in Figure 3-3, we find that the corresponding components of wave V also subdivide into an 8/5 ratio. In other words, the very same numbers, 5 and 8, govern the main targeting relationship for the fifth and final wave in both the Cycle and the Supercycle.

The ratio is nearly as close in Cycle wave V. Applying an 8/5, or 1.6000, ratio to the measuring unit's multiple projects an upside target of 11,716.52, which is off from the actual high by only 6.46 points. Clearly, the DJIA had 5/8 and 8/5 in mind when it registered its final high at 11,722.98 on January 14, 2000.

Notice in Figure 3-4 that waves ④ and IV contain higher prices than the peaks of waves ③ and III respectively and end at orthodox lows that are above their price lows. Thus, there are similarities between these waves in both form and ratio.

Figure 3-4

Part IV: Time Relationships within Waves (V) and V

The time relationships within wave (V) and its wave V component are even more striking than the price relationships.

Figure 4-1: Fifth Waves at Three Consecutive Degrees Form a Hierarchy

As displayed in Figure 2-3, Primary wave ⑤ from 1990 has the same time relationship to Cycle wave V as Cycle wave V has to Supercycle wave (V). Figure 4-1 places these relationships on the same data series. The durations of waves ⑤, V and (V) are 10 years, 26 years and 68 years, respectively. Thus, all three fifth waves, terminating simultaneously, are related by the Fibonacci numbers **5, 13** and **34**, so that ⑤/V = V/(V) = Φ^2.

Figure 4-1

Figure 4-2: Wave Four Divides the Total Duration in Days Exactly into a .6264/.3736 Proportion in Waves V and (V)

The fourth-wave time ratios of Figure 4-1 are quite close to each other when expressed in terms of days, but they are not quite the same. The only way that the ratios pertaining to waves V and (V) could be identical would be for the Dow to have continued to rise after the peak of January 14, 2000. In fact, the primary blue-chip average, the S&P 500 Composite Index, did top later, by 70 days, on March 24, 2000. By continuing to rise until that date, the stock market created the following wave relationships:

- *Within wave V*: Wave ④ ends at 5788 days out of 9240 days, at the **.6264** division point.
- *Within wave (V):* Wave IV ends at 15,491 days out of 24,731 days, at the **.6264** division point.

These two ratios are identical! In fact, they are nearly identical to five decimal places, at .62641 and .62642, respectively. It follows that the corresponding fifth waves each last the same percentage of the total time as well:

- *Within wave V:* Wave ⑤ lasts 3452 days out of 9240 days, or **.3736** of the total.
- *Within wave (V):* Wave V lasts 9240 days out of 24,731 days, or **.3736** of the total.

Thus, in Cycle wave V and again in the entire Supercycle, the split at wave four divides the entire wave exactly at a **.6264/.3736** time division in days when using the date for the low of the Dow in 1974 and the date of the high for the S&P in 2000. (See Figure 4-2.) In other words, once wave ④ ended in October 1990, the market had to rise until exactly March 24, 2000 in order for both waves ⑤ and V, which by definition end simultaneously, to end up having the same time relationship to their corresponding waves one through four. That's exactly what it did. To appreciate the nearness of these numbers, realize that a single day's difference within these decade-long advances would have disallowed identical ratios to four decimal places. In other words, no other date for the final high could have made the ratios closer.

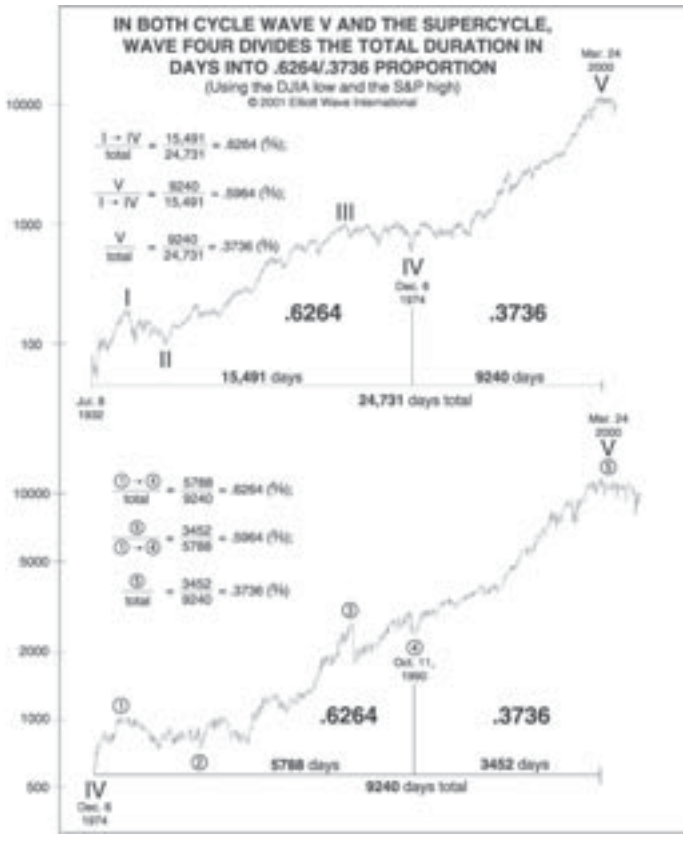

IN BOTH CYCLE WAVE V AND THE SUPERCYCLE, WAVE FOUR DIVIDES THE TOTAL DURATION IN DAYS INTO .6264/.3736 PROPORTION
(Using the DJIA low and the S&P high)
.6264
.3736
15,491 days
9240 days
24,731 days total
5788 days
3452 days
9240 days total

Figure 4-2

Figure 4-3: Waves V and (V) are Time Cross-Related Exactly by .3736 (Φ^2) on Each Side of the Split at Wave Four

Because wave ⑤ is the simultaneously ending fifth-wave component of wave V, each of the two sections of waves V and (V) are also cross-related in time exactly by the same ratio, **.3736 (Φ^2)**.[11] In terms of duration in days, not only does **⑤/V = V/(V) = .3736** but also **①-④/I-IV = .3736.** In other words, the same ratio that governs each fifth wave as it relates to the total structure also governs the components of wave V on either side of wave ④ as they relate to the corresponding components of wave (V) on either side of wave IV. Figure 4-3 shows the three .3736 relationships on one data series for a different perspective.

Figure 4-4: A Fibonacci 5/3 Fraction in Days

Each portion of the time division depicted in Figure 4-2 relates to the others approximately by a Fibonacci number ratio. The duration up to the low of wave four is .6264, which is close to **5/8** (.625) of the total duration, the duration of wave five is .5964, which is close to **3/5** (.600) of the duration up to the low of wave four, and the duration of wave five is .3736, which is close to **3/8** (.375) of the total duration.

Figure 4-4 shows how Fibonacci numbers represent the three durations of each of these waves. The shared time factor is 1155 days for wave V and 3091.375 days for the Supercycle, so that each entire duration is 8 times its time factor, and the sections are approximately 3 and 5 times that factor.

Even the "approximately" is interesting and probably instructive. The difference from a perfect ratio within wave V (bottom graph) is a Fibonacci 13 days. The first section is 13 days "too long," and wave ⑤ is 13 days "short," which means had the wave ④ low occurred 13 days later, the split would have been exactly at the 3/5 point. The difference from a perfect ratio in the Supercycle (top graph) is a Fibonacci **34** days, which means had the wave IV low been 34 days later, the split would have occurred exactly at the 3/5 point.

The ratio between 13 and 34 is Φ^2, which is the same as the ratio between the two entire durations. Therefore, had wave IV ended 34 days later (on January 9, 1975) to make the time split of the Supercycle form perfect 3/5, 3/8 and 5/8 ratios among the durations of its sections, then the low of wave ④ would already be in exactly the right place to divide the resulting total duration of wave V so as to produce the same ratios![12]

Figure 4-4

Figure 4-5: A Fibonacci Progression

If each wave five is related to the preceding section by a Fibonacci ratio, and if the smaller wave is the fifth-wave component of the larger wave, then all five durations are related by Fibonacci, in sequence! Figure 4-5 shows that from wave ⑤ of V to wave (V) of the Grand Supercycle, all the sections form a Fibonacci progression of durations: 3, 5, 8, 13 and 21.

Figure 4-5

Figure 4-6: The Fibonacci-Number Time Relationships Among Wave Components on One Data Series

Figure 4-6 shows the time relationships among wave components on one data series. The duration of each segment is 1171 days (± 21 days) times a Fibonacci number, in sequence.

Recall from Figures 4-4 and 4-5 that the differentials from ideal durations are **13** and **34** days. The maximum differential from the shared factor of 1171 days is **21** days (which appears in the 3x and 13x sections). So the differentials from ideal durations that the market employs in this array are 13, 21 and 34 days, which are consecutive Fibonacci numbers.

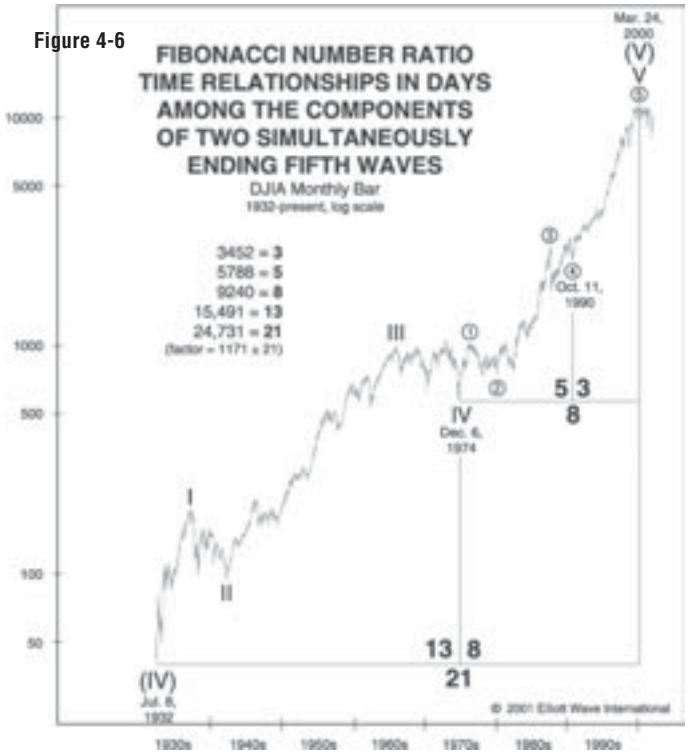


Figure 4-6

Part V: Combining the Observations in Parts III and IV

Figure 5-1: Wave Four as an Identical Divider of Both Price and Time

To appreciate fully the identical positioning of the end of wave four in these two waves, refer back to Figure 2-5 in Part II and recall that the two fourth wave endpoints divide both waves at almost exactly the same logarithmic price point. So the end of wave four is a perfectly *identical marker in time and a nearly identical marker in price for these two waves*, which terminate simultaneously. Figure 5-1 consolidates these observations.

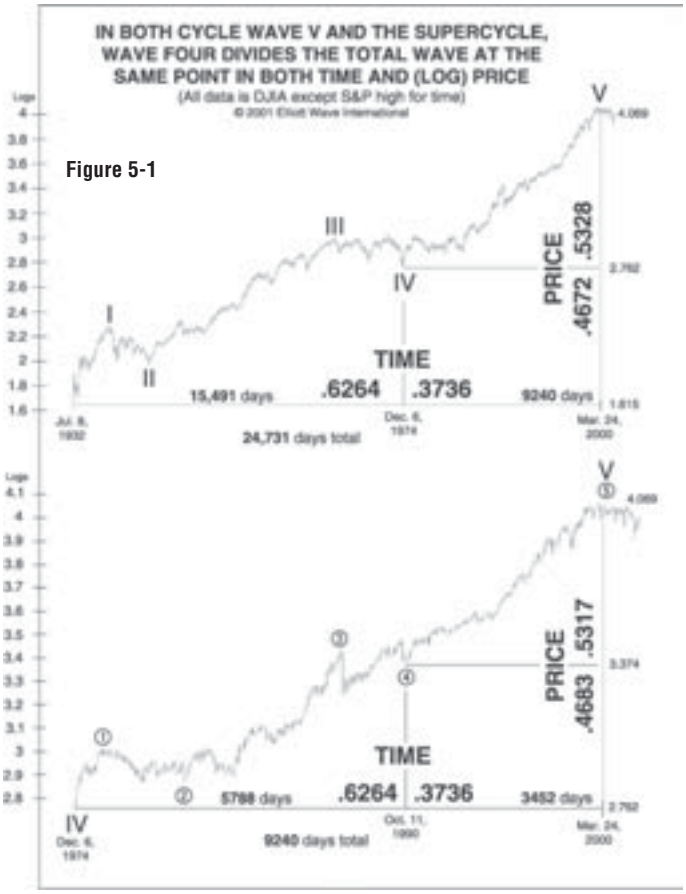


Figure 5-2: The Wave Four Time and Price Divisions on One Data Series

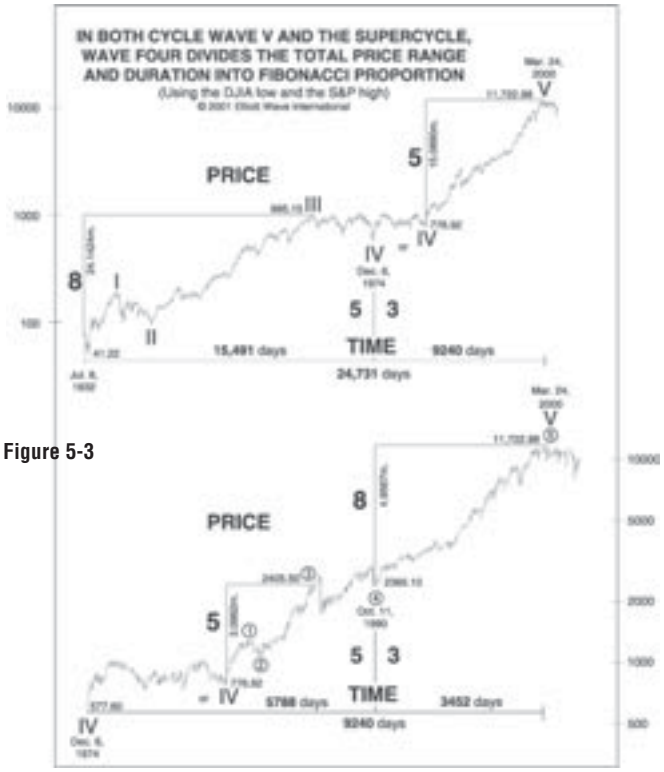
Figure 5-2 shows the wave four time and price divisions on one data series to show how they fit together.

Thus, we may have a new Elliott wave guideline, which is that the end of wave four can be a *time and price divider* that identically subdivides an impulse wave and its same-number component.

Figures 5-3 and 5-4: Fibonacci Fractions in Time and Price

As noted in Figure 4-2, the time ratio that pertains to the period prior to the start of each fifth wave relative to the whole is .6264, which is close to 5/8 (.625). We can say, then, *that the time preceding the start of wave* ⑤ is **5/8** of the *entire time of wave V*, and the *time preceding the start of wave V* is **5/8** of the entire time of wave (V). Therefore, the time ratio between each component is **3/5**, as shown in Figure 5-3. Both **5/8** and **3/5**, of course, are expressions of phi.

Recall from Figure 3-5 that we have similar relationships in terms of price. The price multiple of wave V is **5/8** of the price multiple of the uptrend preceding wave V (i.e., up to the top of wave III), and the price multiple of the uptrend preceding wave ⑤ (i.e., up to the top of wave ③) is **5/8** of the price multiple of wave ⑤.



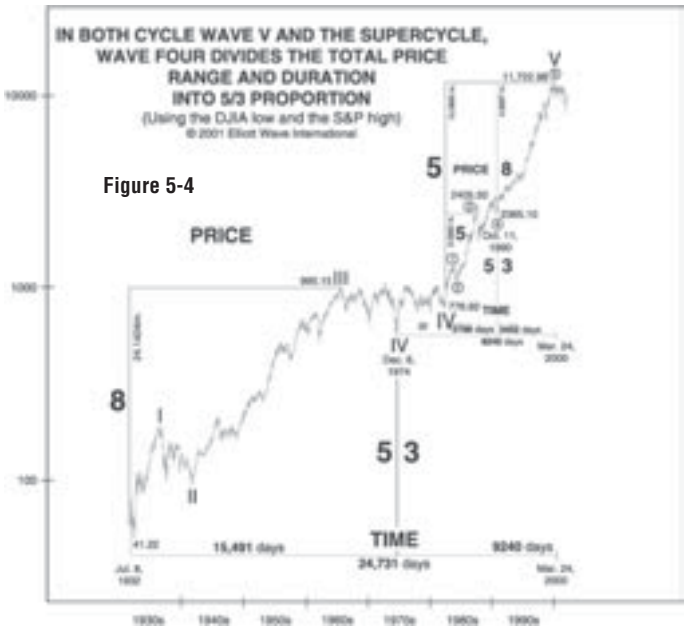


Figure 5-4

Figure 5-3 shows all these observations combined. These results may reveal another guideline, which is that at least in extended fifth waves within larger fifth waves, wave five is related by a Fibonacci ratio in price to the net gain up to a *start* of wave four, while it is simultaneously related by a Fibonacci ratio in *time* to the net duration up to an *end* of wave four. While usually these are single points, Figure 5-3 uses two start points for wave ④ and two end points for wave IV. Figure 5-4 shows the Fibonacci numbers representing the four time and price relationships on one data series.

A New Perspective on the Quantitative Self-Affinity of Elliott Waves

We have several impressive examples of waves that expand Elliott's observation of an extended fifth wave's relationship to the preceding net advance. We have bolstered the implication of his observation by showing that when fifth waves are extended, wave four – at both its start and its end – marks divisions of the entire impulse wave that are significant in defining quantitative affinity with its component fifth wave. Perhaps more important, we have additionally demonstrated that the resulting components of each wave tend to reflect the property of Fibonacci time and price subdivision. This study indicates that various expressions of the Elliott wave fractal, when grouped by their properties of number and extension, and perhaps by degree, may have more quantitative similarities than heretofore suspected.

Endnotes

1. *Prechter, Robert R. (1999). The Wave Principle of Human Social Behavior. Gainesville GA: New Classics Library, p. 56.*
2. *Prechter, Robert R. Ed. (1980/1994). "A Biography of R.N. Elliott." R.N. Elliott's Masterworks. Gainesville GA: New Classics Library, p. 56.*
3. *Elliott, Ralph Nelson. (1940, October 1). "The basis of the wave principle." Republished: (1980/1994). R.N. Elliott's Masterworks - The Definitive Collection. Prechter, Jr., Robert Rougelot. (Ed.). Gainesville, GA: New Classics Library.*
4. *Prechter, Robert R. The Elliott Wave Theorist, September 1982, p. 8, reprinted in Elliott Wave Principle, Appendix, p. 215.*
5. *Prechter, Robert R. The Elliott Wave Theorist, April 1983, p. 6, reprinted in Elliott Wave Principle, Appendix, p. 231.*
6. *Prechter, Robert. (February 2000). The Elliott Wave Theorist, p. 9-10.*
7. *Elliott, Ralph Nelson. (1946). "Nature's Law." Republished: (1980/1994). R.N. Elliott's Masterworks - The Definitive Collection. Prechter, Jr., Robert Rougelot. (Ed.). Gainesville, GA: New Classics Library.*
8. *Prechter Robert R. (1978/1998). Elliott Wave Principle. Gainesville Ga: New Classics Library, p. 138.*
9. *For a recap, see The Elliott Wave Theorist, September 13, 1982, reprinted in Prechter Robert R. (1978/1998). Elliott Wave Principle. Gainesville Ga: New Classics Library, p. 211-214.*
10. *For a picture of this event, see Figure 12 on page 178 of View From the Top of the Grand Supercycle or Figure 16-3 or 19-3 in The Wave Principle of Human Social Behavior and Figure 6-6 in At the Crest of the Tidal Wave.*
11. *This decimal is almost exactly 11/18, which is a fraction that approximates phi with non-Fibonacci numbers. The two sets of adjacent waves are related by (11/18)2, and the alternate waves, 5 and (V), are related by (11/18)4.*
12. *Having done many exercises such as this, I have found an unusual number of times when a long term Fibonacci relationship is nearly perfect yet offset by some small Fibonacci component. It reminds me of the tiny mutations in DNA that allow species to experiment repeatedly with modicums of diversity. I said in The Wave Principle of Human Social Behavior that I do not believe DNA mutations to be random but rather governed by Fibonacci; the same appears to be true of these slight ìmutationsî of perfect Fibonacci ratios in the stock market.*

Biography

Robert R. Prechter, Jr. is president of Elliott Wave International, editor of The Elliott Wave Theorist, author of 13 books and a past president of the Market Technicians Association. This paper is excerpted from his latest book, *Beautiful Pictures* (2003).

Bob has a B.A. in psychology from Yale University, 1971 and is a past president of the MTA, 1990-1991.

Notes